JPRS 74548

8 November 1979

# USSR Report

## RESOURCES

No. 900

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

NOTICE

Beginning with this issue, this report will no longer contain material under the subject category "Minerals." Henceforth this material will appear regularly in the JPRS serial, USSR REPORT: MATERIALS SCIENCE AND METALLURGY.

If you receive your JPRS publications through NTIS, you may wish to contact them to order the USSR REPORT: MATERIALS SCIENCE AND METALLURGY to insure uninterrupted receipt of minerals-related material formerly covered in this report.

If you receive your JPRS publications through a distribution control center, please contact them directly to order the USSR REPORT: MATERIALS SCIENCE AND METALLURGY.

50272-101

| REPORT DOCUMENTATION PAGE | 1. REPORT NO. JPRS 74548 | 2. | 3. Recipient's Accession No. |
|---|---|---|---|
| 4. Title and Subtitle<br>USSR REPORT: RESOURCES, No. 900 | | | 5. Report Date<br>8 November 1979<br>6. |
| 7. Author(s) | | | 8. Performing Organization Rept. No |
| 9. Performing Organization Name and Address<br>Joint Publications Research Service<br>1000 North Glebe Road<br>Arlington, Virginia 22201 | | | 10. Project/Task/Work Unit No.<br>11. Contract(C) or Grant(G) No.<br>(C)<br>(G) |
| 12. Sponsoring Organization Name and Address<br>As above | | | 13. Type of Report & Period Covered<br>14. |

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This serial report contains information on energy, fuels and related equipment; fishing industry and marine resources; water resources, minerals, timber, and electric power and power equipment.

17. Document Analysis a. Descriptors

USSR
Natural Resources
Electric Power
Energy
Energy Conservation
Fisheries
Fuels
Minerals
Timber
Forestry
Water Supply

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group 2C, 2F, 5C, 8G, 10, 21D

| 18. Availability Statement | 19. Security Class (This Report) | 21. No. of Pages |
|---|---|---|
| Unlimited Availability<br>Sold by NTIS<br>Springfield, Virginia 22161 | UNCLASSIFIED | 102 |
| | 20. Security Class (This Page)<br>UNCLASSIFIED | 22. Price |

JPRS 74548

8 November 1979

# USSR REPORT

## RESOURCES

No. 900

## CONTENTS

CONTENTS (Continued) Page

CONTENTS (Continued) Page

ELECTRIC POWER AND POWER EQUIPMENT

# TURBOGENERATOR FOR ATOMIC POWER STATIONS DESCRIBED

Sofia OTECHESTVEN FRONT in Bulgarian 18 Oct 79 p 2

[Text] The world famous "Elektrosila" Trust in Leningrad is building the first turbogenerator with a million kilowatt capacity for the South Ukrainian Atomic Power Station. The Leningrad designers have figured out that the creation of this powerful machine will reduce production costs by 35 percent while, on the other hand, the time necessary for its production will also be reduced. The new machine will occupy much less space in the power station and will be operated by less personnel.

The new machine is being assembled in the plant for powerful turbogenerators by the same team of workers who during the last few years produced the unique 1.2 million kilowatt generator for the Kostrom Thermoelectric station. Very recently the heart of the generator, consisting of 200,000 separate steel pieces, was pressed under 1,000 tons of pressure. The team has also completed the metal section of the 160 ton rotor whose new and unusual design opens possibilities for greater stability and longer duration in the operation of the machine. (Special report)

CSO: 2200

## KHMEL'NITSKAYA OBLAST STRESSES PREPARATIONS FOR WINTER

Moscow IZVESTIYA in Russian 29 Sep 79 p 2

[Article by T. Lisovoy, first secretary, Khmel'nitskaya Oblast Committee of the Ukrainian Communist Party: "A Common Concern"]

[Text] The harsh winter last year was very educational for us. Because we were not sufficiently demanding of the directors of certain services who operate utility lines and because the Soviets and party bodies did not check work closely there were interruptions in the work of certain industrial enterprises, construction projects, and in transportation as well as breakdowns in the delivery of heat and electricity to residential buildings.

The necessary conclusions are now being drawn from the mistakes we made. Back in June the bureau of the oblast party committee reviewed the question of preparations for winter. Specific assignments were given to Soviets and the managers of economic bodies. These steps were discussed at sessions of city and rayon Soviets of People's Deputies. After all, giving the population normal conditions for work, homelife, and recreation, especially during the fall and winter, is one of the principal jobs of the Soviets.

Effective checks on execution of planned measures have been organized everywhere. The party committees and local Soviets have enlisted deputies, standing commissions, people's controllers, and the broad community in this important campaign. Inspections of preparations for winter are being conducted in the cities, at enterprises, and in rural towns.

The paramount challenge is to insure the uninterrupted, normal operation of industrial enterprises. When the temperature dropped sharply last winter the use of gas and electricity in homes and sociocultural institutions increased. But there is a limit. So we had a choice of switching enterprises to "starvation rations" or cutting the delivery of heat to residential buildings. An urgent search was made for reserve sources of heat and energy.

To avoid such a situation again the oblast executive committee has ratified a list of enterprises which, in case of severe cold, will switch partially or entirely to reserve types of fuel. Specifically, all sugar refineries using natural gas will be switched to mazut oil heating in the winter. The tanks for this have been purchased and the oil delivery is being completed. Many other enterprises are also establishing stocks of reserve fuel, raw and processed materials, and spare parts.

Much has been done to insure normal working conditions in construction. Steps are being taken that will make it possible to get roofs over more projects before cold weather arrives. Then during the winter indoor finishing work will be done at them. Work to install the equipment at heat supply points, boilers, and heat pipes for heating and drying nonresidential and residential buildings under construction is being pressed. Priority start-up projects are being specially watched. At them glass windows are being put in, insultation work is underway, and dining halls, warm dressing rooms, and drying rooms are being fitted out. In short, all necessary steps are being taken so that construction workers will be able to work with high productivity and fulfill their planned program during the cold season.

In the range of winter preparation jobs special attention is devoted to economical use of energy and reducing losses. We have some experience in this. Last winter comprehensive inspection covered almost all the rayons of the oblast. Careless leaders were punished for irrational, wasteful use of energy. As a result we have already saved 12 million kilowatt-hours of electricity and a great deal of gas and other types of fuel this year.

We have not done everything yet, of course. During the inspections it was found that some enterprises have installed engines with heightened power ratings. The temperature control of furnaces has not been adjusted in every case. Some places use heating devices that waste fuel. All these shortcomings are being eliminated today; we are getting everything organized everywhere. It is helpful to introduce the work practices of our best enterprises, in particular the Khmel'nitskiy Tractor Aggregate Plant. They reviewed energy use norms there. All workers took part in an economy campaign competition. Energy use at the plant was reduced by more than 10 percent compared to the norm. The energy saved was enough to produce 4.5 million rubles of output. Many labor collectives are now following the example of this enterprise.

Party bodies and the executive committees of local Soviets are focusing on questions of improving the work of transportation. Special commissions have been set up in all city and rayon centers to work in close contact with the Soviets of People's Deputies. All the motor vehicle enterprises are now completing work to install engine warmers for starting vehicles in cold weather. Busses will be able to work in any weather.

Last winter the bus schedule was disrupted by snow drifts. People were late to work and children were late to school. Snow removal machinery will now be concentrated on the roads that are most vulnerable in this respect, and materials that will insure safe traffic conditions are being stockpiled everywhere. Overhaul of the vehicles to clear main city streets is being finished. The roads adjacent to industrial enterprises and construction sites have been assigned two vehicles.

The work of rail transportation has been taken in hand. Special attention is being given to the condition of sidings and loading points and to preparation of machinery. Of course, we are not forgetting passengers and their convenience either. New stations and stops have been built and existing ones repaired. Transportation schedules are being revised so that they will be convenient and mesh better with the work schedules of enterprises, establishments, and orgarizations.

Winter is a major test of municipal services. Building committees and housing operations offices are competing for best preparation of apartments, entryways, and buildings for winter. Citywide inspections of residential buildings, development areas, and streets and main roads are being conducted. Members of repair teams, inspection commissions, deputies, and representatives of the public are participating in them. By 1 September the annual plan for housing repair was 93 percent fulfilled. Preparation of central heating systems is being completed. Since last year the delivery of heat to indoor areas in the oblast centers has been automatically regulated depending on the outside temperature. This is very advantageous; it reduces fuel use, saves the wages fund, and guarantees good, consistent heat supply. The best measure of this innovation is the fact that there were virtually no complaints from residents of the oblast center last winter concerning breakdowns of heat supply. We are now working on introducing this innovation in other cities.

Differentiated gas supply has worked out well in the oblast. This is particularly justified in the winter, during sharp cold spells. We are doing everything we can to see that there are no disruptions of heat supply to residential buildings and to medical, educational, and preschool institutions.

Needless to say, even with the most careful preparation it is possible there will be breakdowns of fuel, energy, and sanitary engineering equipment. Additional specialized brigades of repair workers have been established in the cities and rayon centers for such exceptional cases. These brigades have transportation, tools, and the necessary materials. The dispatcher services, whose job is to respond as quickly as possible to alarm signals and complaints by inhabitants, are being given greater responsibility.

Preparation of cities, towns, and settlements for the winter is not a matter for municipal service workers alone. It should also involve the inhabitants themselves, the broad community. It is important to

insulate apartments, seal windows and balcony doors, conserve heat, electricity, gas, and water, and carefully use and preserve housing facilities. The purpose of all the explanatory work we are now doing is to instill a proprietary attitude toward one's apartment, building, and neighborhood. Appeals are being published and statements put out on local radio and in the press.

Nothing is unimportant in preparing for winter. The slightest mistakes may have serious consequences. Winter readiness passes are being instituted in our oblast following the example of the Soviets of People's Deputies in Tol'yatti, described in VESTIYA. Passes will be given to industrial enterprises, construction projects, organizations, and housing-municipal facilities which have prepared well for the winter.

In our oblast where more than half of the population lives in the countryside, the supply of heat to kolkhoz members and sovkhoz workers becomes especially important. We have taken steps not only to use allocated coal, peat, and wood at the right time, but also to procure more fuel from local resources. About 5,000 cubic meters of scrap wood from the lumber and woodworking industry, an equal amount of peat and briquettes, and more than 3,000 tons of coal in addition to allocated amounts will be sold this year. Special attention is being devoted to supplying fuel to disabled veterans of the Patriotic War and labor, the families of war victims, employees of livestock farms, and machine operators. Fuel is delivered to the home by order for them and all others who want it.

Preparations for winter raise many varied problems. It is also important to insure uninterrupted work by trade and domestic enterprises, and we are giving this serious attention. All the work done in this direction in our oblast aims at successful performance of the tasks of the present and concluding year of the 10th Five-Year Plan.

11,176
CSO:1822

## UZBEK LAB STUDIES WAYS TO IMPROVE ELECTRICITY EFFICIENCY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 Aug 79 p 2

[Article by L. Kaybysheva, correspondent at the press center of the USSR Ministry of Power and Electrification: "Under Computer Control"]

[Text] The planning and calculation of the economy of energy supply to an industrial enterprise is usually done with norms based primarily on experience. SOTSIALISTICHESKAYA INDUSTRIYA has already taken note of the useful practices employed for efficient use of electricity in Uzbekistan. People's controllers work energetically there and, together with scientists, they help many enterprises successfully introduce a system of interaction between power workers and customers that takes account of the daily potential of the energy system and makes it possible to use electricity in precise compliance with the confirmed shift schedule.

The laboratory of industrial electrical power of the Uzbek Institute of Power and Automation is searching for optimal ways to use energy. The laboratory is headed by candidate of technical sciences A. Dzeventskiy. This small collective is most interested in the most energy-intensive enterprises, those which operate large electrical and electrothermal furnaces. During the launching period each of these furnaces is capable of consuming the output of an entire power plant.

It has been learned that the energy consumption of a furnace during launching may be reduced by four percent with a simultaneous six percent increase in its productivity. The Tashkent Abrasives Combine achieved this improvement in the technical-economic indexes of its silicon carbide furnace with virtually no additional capital expenditures.

"I don't see any test benches or models here," I said to the laboratory head.

"We study production at the site, in all its possible regimes. We communicate the results obtained to production workers and process them

on our institute's computer," A. Dzeventskiy explained. "By the end of a study the ideas we have developed are usually almost completely introduced in production. We have learned the effectiveness of this method from experience with six enterprises in different industrial sectors."

The collective of the laboratory is also interested in the work of the power system. It is common knowledge that at certain hours of the day when new customers are plugged into the network, the energy system experiences significant overloads. Here too the scientists are searching to find the optimal way to even out the load schedule.

Whenever possible customers try to switch their most energy-intensive equipment to work at night. But enterprises with continuous operations cannot turn off their furnaces. For example, the furnaces at the Tashkent Abrasives Combine and the Dzhambul and Chimkent phosphorus enterprises work almost without interruption and cannot be turned off owing to production technology. Researchers at the laboratory were able to find a schedule of equipment operation under which the electricity consumption of these enterprises is cut 40 percent during the most intensive evening hours.

A procedure developed by the laboratory enabled the Akhangaran Cement Combine to conserve 50 million kilowatt-hours of electricity a year. This technique can serve as the initial element in formulating automated control systems for various kinds of enterprises. The technique has been introduced in both cement production and various other areas.

11,176
CSO:1822

ENERGY CONSERVATION

FOREMAN RELATES ALTERATIONS MADE AT NEW PLANT

Moscow IZVESTIYA in Russian 27 Sep 79 p 3

[Article by N. Polyvyanyy, foreman of the energy shop of the Stryy Metal Reinforced Concrete Construction Elements Plant, L'vovskaya Oblast: "Economy Begins with the Plan"]

[Text] Concern for public property is a frequent subject of talk and writing. This was pointed out once again in the recent decree of the party Central Committee entitled "Further Improvement in Ideological, Political Indoctrination Work." This is entirely correct. We must continuously call for zeal in this. The people are very right in the ancient saying that, one does not become wealthy from large income, but rather from Some enterprises pursue profit at any cost. This is easier, of course, and less trouble. But the "impact" from this is an obvious loss for everyone. It is a different thing when less metal, materials, fuel, and electricity is used to manufacture specific articles without impairing their quality. The savings made here is an excellent reserve through which we can produce more output and bring benefits to the state, the plant, and to the workers at it.

Let us take our enterprise for example. It now produces three times as many metal and reinforced concrete design elements for power plant construction projects as it did a few years ago. Expansion of production capacities has played a part in this. The worker community is also expanding. Several multi-apartment buildings with steam heat and hot water have been added to it. Compared to 1976 the furnaces are burning 1 million cubic meters less natural gas. The savings from this is more than 20,000 rubles a year.

I would like here to mention a subject that is certainly not new, but still keeps its significance. This is the citizen's duty of each of us to do things so that the final results are significant, regardless of where they will be received and by whom. We say fairly often that this is exactly what we must do and that our job must be considered as part of the overall struggle to improve efficiency, but we do not always apply this to ourselves personally.

Construction on our plant began at a time when the country already had fairly significant capacities for producing prefabricated reinforced concrete. This meant not only that the specific features of such production were known, but also that we had a certain amount of practical experience. The planners could have taken this into account and given our technological conditions a closer look. But they did not. They used the standard concepts for the design and, as they say, forgot about it. But when the plant was launched their mistakes became apparent. They had to be taken care of, or we could not have avoided wasting fuel and electricity.

I will not go into all the fine points of the alterations that we ourselves made. But I want to mention a few of them to show how the planners could have figured out the things that we did.

I will begin with the heat pipes. The builders put them in according to the plan, with one outlet from the boiler and a simultaneous hookup of all heat consumers to it. But depending on the season and technology, some need steam at lower pressure and some need it at greater pressure. Even if we in the shop had been magicians we could not have handled this problem. It is true that the pipes had wells with closing devices. It is not very easy to get into them in the summer, and in winter it is even harder. We had to think up a solution, and we did. We divided the main heat line into three separate sections and made openings to the boiler from each of them. This put an end to the former waste where everybody was given steam under high pressure and natural gas was burned for nothing.

The boiler itself had to be reconstructed. Following the rough drafts of the planners, 10 pumps were installed in it. We looked at this and ascertained that it had been done unnecessarily. Some pumps were used only sporadically and in reality just took up space, creating difficulties for service personnel. It took some efficiency worker resourcefulness to solve this problem. We made calculations and drawings, showed them to engineers in the plant administration, and our idea was approved. Through our own efforts we changed the charts of technological processes and six pumps proved superfluous as a result.

Of course, there are different ways to evaluate such rationalization. Some will say that we removed equipment worth several hundred rubles and now we are bragging. We can answer that, if you do not save kopecks you cannot save rubles. There is also another response. This fairly simple design alteration allowed the energy shop to stop being a tight spot. Production areas and residential buildings now receive enough steam. Therefore, in cold weather we have heat everywhere, both in production and in the apartments. I cannot help mentioning also that reducing the amount of equipment improved the working conditions of the furnace men. Today they are really operators.

Finally, here is one more example. It shows again that we can economize if we do not forget our citizen's duty, to approach our work as proprietors.

The time came to build a 60-apartment building with all conveniences. At first it seemed that if a supplementary heating point were not constructed along the line running from the plant boiler it would not be possible to deliver normal steam and hot water to the entire settlement. The planners were called in, and showed no interest in the capabilities of our shop. This is most likely because they were looking at their own interests: an order was offered, so why should they refuse it. It called for construction of a service building, equipping it, and assigning service personnel there. We advanced a counterproposal: get by with a minimum of additional equipment, all at the boiler room itself. Under our plan no new construction was needed, and this saved 15,000 rubles.

It is possible that the cases I have chosen to cite will not seem worth writing about in the newspaper. But you must agree that when a campaign has begun to raise economic efficiency and the quality of work by every means, we cannot ignore any small contributions. We cannot ignore them, because the largest river receives its force from little streams.

I will not hide the fact that I wrote this article for a purpose. There are among the planners, members of a profession that is widespread and respected in our country, some who do not make themselves consider the state point of view and compare expenditures with final results in the form of concrete output. But this must be done, and even in the stage of preliminary drawings of the future enterprise, using everything new and progressive suggested by experience. I call on planners to do this. If they do not, there will be repetitions of what happened at our plant: expenditure of considerable capital and labor for the energy system, and then many alterations requiring more expenditures.

I do not want to say that we intend to make things easy for ourselves. Nothing of the sort. We will work hard to find additional ways to economize and implement them in our production area. But the best way to do this is not by correcting planning mistakes. Saving material resources, fuel, and energy is a national concern. And all of us, from planners to operations workers, must take part in the thrift campaign.

11,176
CSO:1822

## KHAR'KOV TURBINE PLANT PRODUCTS FAULTY, SERVICE POOR

Moscow IZVESTIYA in Russian 28 Sep 79 p 2

[Letter by G. Vigdorovich, chief engineer, Reftinskaya GRES, editorial comments, and note from V. Kuzin, chief of the division of spare parts for thermal power equipment of the USSR Ministry of Power and Electrification: "Half-hearted Efforts, Tripled Costs"]

[Text] Letter (G. Vigdorovich, chief engineer, Reftinskaya GRES, Sverdlovskaya Oblast)

The Reftinskaya GRES is one of the most economical in the country.

We use coal from Ekibastuz and try to save fuel by every means. A great deal depends on skillful use of equipment. This determines a great deal but, unfortunately, by no means everything. The quality of the equipment itself is very important. This sometimes disappoints us. The 300,000-kilowatt turbines manufactured by the Khar'kov Turbine Plant and installed at our power plant, go down frequently because of design flaws in the blades. The plant knows it. Nonetheless, they are not supplying us with the spare blades necessary for emergency replacement.

For example, turbine No 1 has been working with an incomplete set of blades since 14 June; to be precise, the third stage of the low-pressure cylinder has no blades. They broke before the calculated service life, and the plant has not sent replacements. As a result the power plant is forced to use an additional 1,500 tons of standard fuel each month. With this fuel we could produce about 5 million kilowatt-hours of electricity each month. Turbine blades have also gone out in the second unit.

The unreliable functioning of turbine equipment is a matter of great concern to the collective at our power plant.

Commentary

Upon receiving this letter we immediately contacted the Khar'kov Turbine Plant Association. An engineer from the plant soon brought us an answer from deputy chief designer M. Zerchenko.

We do not have room here to publish the full note of explanation. What it says, in brief, is that the turbine plant is not to blame. The level of world science is simply low, and there are still certain problems. The note does not respond to the essence of our questions. After reading the note it remains a mystery why blades broke so frequently in turbines made by the Khar'kov plant, why there is a shortage of sets of replacement blades, how many of them are generally needed to support normal power plant operations, and when these blades will be received.

The Khar'kov plant people say that the level of reliability of these turbines matches the current level of world turbine construction and at the same time they admit that the blades are breaking prematurely. Such a statement cannot help arousing confusion. One forms the impression that the people at the Khar'kov plant did not read the order, adopted back in 1976 for the Ministry of Power Machine Building, entitled "Steps to Improve the Reliability and Quality of Manufacture of K-300-240 Turbines at the Khar'kov Turbine Plant." According to the order this plant was obliged by 1 March 1977 to clearly lay out ways to supply replacement blades to power plants and to identify the causes of breakage and eliminate them.

Of course, there will always be things that science does not know. However, the turbine of the same capacity, K-300-240, manufactured at a different plant, in Leningrad, does not draw complaints from the operations workers. Furthermore, the Leningrad plant does not wait until newspaper articles appear to supply power plants with spare parts.

We called on the USSR Ministry of Power and Electrification, the spare parts division, to receive a qualified opinion from operations personnel concerning the troubles of the Reftinskaya GRES. Here is the answer we received from V. Kuzin, chief of the division of spare parts for heat and power equipment at the USSR Ministry of Power and Electrification.

[Response by V. Kuzin, USSR Ministry of Power and Electrification]

Large-scale breakage of turbine blades is an extremely unusual phenomenon in the power industry. At our thermal power plants this is occurring where turbines designed and manufactured by the Khar'kov Turbine Plant with 300,000-kilowatt units are operated.

When even one blade breaks it often causes further turbine damage. Like a house of cards, the falling element knocks over neighboring ones, so that a single broken blade knocks out a whole row of following parts. As a result, the time and labor required to repair the turbine is unjustifiably increased.

If a plant has backup working blades and other spare parts the trouble can be taken care of quite quickly. If it does not a plant sometimes,

as happened at the Reftinskaya GRES, is forced to launch its turbines after repair with an incomplete set of blades, even though this is technically prohibited and inefficient. The power of the turbine is, of course, reduced by the smaller number of working blades. More steam must be fed to the remaining blades to achieve the former power from a turbine. This means that extra fuel must be used.

The Ladyzhinskaya and Tripol'skaya GRES's, like the Reftinskaya GRES, had to remove broken blades last year and launched the turbines with incomplete sets. Before they were able to reinstall new blades to replace the broken ones, the two plants together used an extra 3,200 tons of standard fuel, which could have produced about 10 million kilowatt-hours of electricity.

Three power units at the Novocherkasskaya GRES have already been in repair for 2,800 hours this year because of failure to receive reserve blades on time. During this time they could have (but they did not!) produced an additional 730 million kilowatt-hours of electricity.

Blade wear increases every year. This means that in the near future we will need many more blades for replacements than are now being produced. To repair working turbines some power plants, for example the Pridneprovskaya, Novocherkasskaya, and Tripol'skaya plants, have been forced to break down all nine of their standby rotors worth a total of 1.2 million rubles. But these rotors, which are designed for emergency replacement, can no longer be used.

The USSR Ministry of Power and Electrification has raised this question of supplying power plants with working blades and other spare parts in the necessary amounts with the Khar'kov Turbine Plant and the Ministry of Power Machine Building. However, the plant is not expanding the production of blades and other spare parts needed for repair such as regulator parts, turbine packing, and special fasteners. The Khar'kov plant falls short in delivering spare parts every year.

Sometimes the directors of a large thermal power plant even have to travel to Khar'kov and ask for spare parts such as blades and even smaller articles at the plant. Representatives of many power plants literally never leave the Khar'kov plant. This "work on wheels" is of great concern to the power plants during repair jobs.

The facts given show that plant employees do not feel adequate responsibility for the products they produce, that professional pride in the reputation of their trademark has dropped. They also indicate that the Ministry of Power Machine Building is not applying proper standards. I will give an example for comparison. The steam turbines produced by the Sverdlovsk Turbomotor Plant of the same ministry work fairly well. Even in those exceptional cases when particular parts malfunction for some reason, the plant takes urgent steps to eliminate the problem. This illustrates their high qualifications and sense of responsibility, in addition to the good quality of the equipment

they produce. The situation that has developed with delivery of spare parts by the Khar'kov Turbine Plant is absolutely intolerable and requires firm steps.

From the Editors

It is perfectly clear that after issuing its order three years ago the Ministry of Power Machine Building did not check on execution of it. Meanwhile the significant violations of production technology permitted by the Khar'kov Plant accumulated. There are inaccuracies in technical drawings. Manufacturing technology does not match the plan. The surface of the outer edges of the blades is rough and has to be polished. If it is not the blades are not reliable. The plant is writing up an authorization for parts to deviate from the dimensions specified in the drawings. The ministry has pointed out the slackness of production discipline and quality control.

It is possible that the plant has taken care of some of these problems. But we must judge by the final results, and it has not changed. Blades manufactured by the Khar'kov plant break before their calculated service life and the plant does not provide spare parts in time.

What steps is the Ministry of Power Machine Building taking?

11,176
CSO:1822

## BRIEFS

FAR EAST KELP HARVEST--This year 1,000 quintals of laminaria will be harvested in coastal waters of the Far East. Special brigades of Primorye and Sakhalin fishing combines have completed harvesting this seaweed in waters around the Kuril islands. Harvesting of the laminaria in northern Primorye waters will continue for another 15 days. [Vladivostok Domestic Service in Russian 0930 GMT 10 Oct 79]

CSO: 1822

## DEPUTY MINISTER OF COAL INDUSTRY EXAMINES UNDERGROUND OPERATIONS

Moscow UGOL' In Russian No 8, Aug 79 pp 4-10

[Article by Ye. N. Rozhchenko deputy minister,, USSR Coal Industry: "On Some Problems in the Development of the Underground Method of Coal Extraction"]

[Text] The efficiency of the underground method of coal extraction has always determined the economic state of the coal industry. Even today, when the open pit method of coal extraction has an ever larger share in total coal production, the significance and influence of shaft operation indicators on the sector's economy have not diminished.

The positive changes in extraction structure which have been implemented and are being planned although they do reduce unit costs for coal extraction in general, ensure a growth in labor productivity, and have a definite effect in improving work conditions and safety, cannot in themselves provide for a significant improvement in the sector's economy. The achievement of this goal requires substantial improvements in shaft operations, making use of the progressive experience which has been acquired and has widely justified itself over the past two five year plans.

In addition, it is necessary to properly evaluate the measures for production efficiency improvement implemented during 1965-1975 and the present day shortcomings which markedly lower the growth rates of basic technical and economic indicators and at times even effect their absolute magnitude.

First of all - the growth of labor productivity at mines in the USSR. From 1955 to 1965 shift productivity at mines increased by only 348 kilograms, or by little more than 24%. During the 8th and 9th five year plans it increased by more than 1,048 kilograms, or by almost 60%. During these two plans the number of workers employeed in coal extraction at shafts declined by 163,000, and for those employed in underground operations the decline was 115, 000. This is a large technical and social achievement for the industry.

A decisive role in improving efficiency at mines was played by the September 1968 decision of the government on technical measures for modernizing the coal industry. It clearly determined the main directions in the development of production processes and equipment. More modern and powerful machinery and transport equipment appeared, and greater attention was given to the reconstruction of enterprises and the liquidation of bottlenecks in the sequences of processes. This increased enterprise capacity and coal extraction volume. During a short time and at insignificant costs some small mines exceeded their planned capacity by 2-3 fold and more. The following mines were among them: the Nagornaya, Zyryanovskaya, imeni 7th of November in the Kuzbass; the imeni Lenin in the Karaganda Basin; the imeni 22nd CPSU n Congress and the Rutovka-Donetskaya in the Donbass, and others.

An exceptionally important rol. in the technical modernization of the coal industry was played by the introduction of the mechanized mining systems, the OKP, the KM-81, the KM-87, and the KM-97 with hydraulic props, as well as by the use of conveyors to haul coal from the working faces to the main loading points. Efficient systems appeared for preparing and working coal beds lying in favorable geological conditions. In combination with the potentials of new technology this made it possible to attain previously unseen work rates at mine faces.

The movement of "thousandeers", "five hundred thousandeers" , and millionaires "millionaires" was born at this time. Following their example, numerous brigades showed an increased interest in improving the growth of coal extraction per working face. Socialist competition between participants in this movement acquired a mass character.

Work was simultaneously conducted at mines to improve the throughput capacity of lifts and transport, and to improve ventilation. Internal resources were sufficient to increase coal extraction by more than 9 million tons annually at mines operating on 1 January 1966 and at the same time significantly reduce the number of workers. At the same time the number of mines (technical units) was reduced from 966 in 1965 to 727 in 1975, and the number of working faces from 4,962 to 3,120

Thus, improved efficiency of coal mines during the 8th and especially the 9th five year plan was the result of multiplanned activities of workers at enterprises and associations and the USSR Ministry of the Coal Industry in the improvement of production technology and organization both in underground operations and at the surface of mines. This activity was directed towards one goal - the extraction of more coal at less cost.

However, in addition to notable achievements, in recent years shortcomings x have started to appear in production organization , the standards of which do not always correspond to the high rates of concentration in coal extraction. There has also been lagging in the development of some technological processes. This is above all manifested in disproportions between the growth rates of coal extraction at working faces and the conduct of preparatory operations. An effect is beginning to be seen from lagging in the creation, improvement, and production of some machinery and equipment, their insufficient capacity and reliability, slowdowns in the mechanization of auxiliary operations, errors with regard to problems of ventilation degasification, and intermediate storage at mining operations. All these have become reasons for reduced coal extraction growth rates at working faces. Many of these shortcomings have now become serious problems and are delaying further developments in production.

One of the most widespread shortcomings is the lack of the necessary number of working faces at many mines. This restricts coal extraction growth, and makes it more difficult to reach planned capacity. According to statistical data, in 1978 alone, 4 million tons of coal were lost because of this. Lagging in preparatory operations is the reason.

At the same time, nobody can doubt that in the past 10-15 years the development of mining operations has been based on progressive engineering decisions and has proven itself by high growth rates in coal extraction and labor productivity. As was noted above, during the past 10 years the number of operating working faces has been reduced 1.6 fold, annual operational volume has declined by 31%, while the reserves ready for extraction have increased from 282 to 338 million tons. Daily extraction per work face has increased an average of 80 percent at the Vorkutaugol', Yuzhkuzbassugol', Karagandaugol', and some other associations it has increased 2 - 2.5 fold.

It is thus obvious that the process of concentrating mining operations has been directed towards increasing the work load at existing faces and sharply reducing their number. Naturally, this is based upon the reduction of tunneling operation volume and the number of workers, as well as upon increases in labor productivity. However, the gradual expansion in the use of mechanized pit props in beds with conditions not appropriate to their technical characteristics, the shift of mining operations to mine fields with poorer mining geological conditions (the number of high gas content beds and beds with danger of explosion has doubled, due to the move to deeper horizons, at many mines rock pressure has increased markedly and the temperatures of the surrounding rock have risen), and the shortcomings

mentioned above have, during 1977-1978, led to a reduction in extraction from walls not only as a result of changes in the structure of equipment used, but also to changes in the walls using such equipment.

Data on changes in loading per work face (in tons per day) for various basins are presented in Table 1. and for various types of complexes in Table 2.

| | 1975 | 1976 | 1977 | 1978 |
|---|---|---|---|---|
| USSR - Total | 454 | 467 | 460 | 444 |
| Ukrainian SSR Ministry of Coal Industry | 394 | 402 | 390 | 370 |
| Basins: | | | | |
| Don | | | | |
| Donetsk | 393 | 400 | 387 | 366 |
| Kuznetsk | 481 | 502 | 509 | 510 |
| Karaganda | 876 | 900 | 876 | 876 |
| PoPodmoskovnyy | 584 | 608 | 604 | 579 |

Table 2

| Equipment Complex | 1975 | 1976 | 1977 | 1978* |
|---|---|---|---|---|
| KM-81 | 1,153 | 1,170 | 1,095 | 1,013 |
| KM-87 | 876 | 858 | 820 | 761 |
| KMK-97 | 578 | 569 | 543 | 526 |
| "Donbass" | 488 | 520 | 522 | 508 |
| OKP | 1,222 | 1,184 | 1,148 | 1,092 |

* Data from VNIIugol'

The Karagaylinskaya Mine in the Prokop'yevskugol' Association, extracting grade Zh coal and suppling the large Belovskaya TSOF [not further identified] with raw material is an example of the direct influence of changes in mining conditions on the efficiency of integrated mechanized coal extraction. Two years ago there were four-five walls in operation equipped with OKP complexes with loading rates of more than 1,000 tons per day each. The mine had reached its planned capacity. Today, at deeper levels, it is necessary to have 7-8 walls in operation to attain the same extraction and to support the subsequently different volumes of tunneling and to meet preparation work deadlines.

In order to compensate for loading reductions due to worse mining-geological conditions, it is necessary to increase the number of operating faces. However, this requires time and larger volumes of preparatory work. In such a situation the stability of the work front can be ensured by the reserve front. Unfortunately, at the majority of mines such fronts have been on the lists, but have not, as a rule, been utilized. Coal extraction plans are fulfilled at those mines where there are reserve faces and they are included operational . For example among the six mines in the Leninskugol' Association, at three (imeni S. M. Kirov, Kuznetskaya, and Kol'chuginskaya) there were, for various reasons, deteriorations in work at some walls, and loadings fell by 60-300 tons per day. However, thanks to the presence of reserves in the number of working shifts and actual physical walls, the plan was fulfilled for all indicators. Three other mines (Komsomolets, Oktyabr'skaya, and Chertinskaya), loading 1,000 tons of coal and more per day at each operating face, had shortfalls in the plan amounting to 565,000 tons of coal in 1978, simply because they did not have a reserve work front. Sometimes many progressive brigades work 100 percent on reserve and this proves to be economically justifiable. The reserve problem was once widely discussed and a proper decision was made, which was written in Section 76 of the PTE [Technical operation rules] to have equipped work faces, but to have one shift operations for coal extraction. However, during a survey conducted in 1977 it was determined that out of 549 walls listed on reserve, only 28 could be converted to reserve-operating conditions. The remaining walls were not equipped, poorly equipped, located in zones of geological disturbances, in front of untouched blocks, etc.

The task is to rapidly change the ratio between planned loadings at faces, the volumes of preparatory work and the number of operating work faces by increasing the absolute volume of extraction work and the number of work faces, including reserve-operational (with one shift extraction operations). It is essential for each mine to have a reliable reserve. Then, during the preparation of additional frontage labor productivity might be reduced somewhat, but later a bigger payoff will be obtained through reductions in extraction brigade idle time and increases in total coal extraction.

In 1978 integrated mechanized faces not fulfilling the extraction plans, had shortfalls totalli g around 30 million tons of coal. This corresponds to about a 6 percent loss in labor productivity at the sector's mines. These losses were primarily due to various types of delays which to a considerable extent could have been avoided by having reserves.

The shortage of work frontage is also a consequence of delays in introducing faces into operation. During 1977-1978 there were 2,540 transfers of extraction brigades to newly prepared integrated mechanized work faces. Of this total 470 experienced delays of from 10 days to 3 months, causing a loss of more than 5 million tons of coal. One hundred sixteen transfers were delayed because of the lack of prepared work faces; 95 due to slow installation work (23 days instead of the 8-15 called for by norms); and 180 as a result of delays in equipment repair and the failure of machine building plants to deliver equipment on time.

One should note that at present there is a tendency towards the reduction of mine equipment use factors. Because of this shortcoming, working mines x and associations frequently strive to increase the number of working integrated mechanized faces by stretching out the service life of worn out sections of mechanized pit props. There are now 165 complexes manufactured by the Uzlovskiy machine building plant during 1969-1973 in operation at mines. This leads to reductions in loadings at work faces which are equipped with machinery which has outlived its working life. In addition, this increases the number of reinstallations, and also the amount of equipment being installed, removed, under repair, inoperative, or poorly outfitted.

In analyzing data on the use of equipment at the USSR Ministry of the Coal Industry's mines,(Table 3), one comes to the conclusion that the number of complexes in use in the past 3 years had declined by 24.4 percent, the number not in use has increased by 73.7 percent. During the same time the number of extraction combines in operation has declined by 2.1 percent, and the number not in use has increased 13.3 percent. A similar situation is also observed for other types of basic equipment. This indicates insufficient standards of technical servicing and repair of equipment at mines, at TSEMM [Not further identified], and at ore equipment repair plants. It also points to serious shortcomings in the organization of installation and removal work at integrated mechanized sections.

Table 3.

| | Mechanized pit props | | | Extraction combines | | |
|---|---|---|---|---|---|---|
| Year | In use | Not in use | Use factor | In use | Not in use | Use factor |
| 1975 | 1,014 | 243 | 80.7 | 2,569 | 1,167 | 68.8 |
| 1976 | 1,140 | 280 | 80.3 | 2,581 | 1,360 | 65.5 |
| 1977 | 1,240 | 336 | 78.7 | 2,542 | 1,442 | 63.8 |
| 1978 | 1,261 | 422 | 14.9 | 2,514 | 1,322 | 65.5 |

| | Tunnelling combines | | | Scraper and belt conveyors | | |
|---|---|---|---|---|---|---|
| Year | In use | Not in use | Use factor | In use | Not in use | Use factor |
| 1975 | 1,022 | 388 | 72.5 | 38 479 | 4,939 | 88.8 |
| 1976 | 1,118 | 430 | 72.2 | 39,169 | 5,253 | 88.2 |
| 1977 | 1,148 | 475 | 70.7 | 38,048 | 5,366 | 86.0 |
| 1978 | 1,156 | 493 | 70.1 | 37,187 | 4,892 | 88.4 |

In May 1975 it was decided to introduce at all mines a new procedure for equipment technical servicing. This procedure made use of order-reports which gave an increased role to engineering ratings during the conduct of obligatory inspections, adjustment, and current repair of equipment. At the present time order-reports are now used at 80 percent of all mines, and at many of them this work is conducted at a high technical standard: there is regular acquisition of data on the fulfillment or nonfulfillment of work volumes, and reasons for deviations from plant recommendations are determined. This permits properly evaluating the condition of machinery and planning the essential measures for repair-preparatory shifts. These mines are developing incentives schedules for work organization in preparatory shifts. Based on the complexity and intensity of the work to be conducted, an estimate is made of the technically justified number of workers of a given level of qualification engaged in technical servicing.

However, a sizable share of mine managers and engineers are only formally involved in this important matter. They have unsatisfactorily organized the technical servicing of complex equipment, and are devoting clearly insufficient time to its inspection and adjustment. As a result there is an increase in the accident rate and idle time. Sector coal extraction losses for these reasons is reaching 6.5 million tons annually. Association managers and specialists are obligated to exercise unremitting supervision over all problems in work organization to ensure accident free operation of mining equipment.

One must note that designers of machinery and workers at machine building plants creating and producing new, and ever more productive equipment are not giving enough attention to problems of quality, longevity, and repairability of machinery. As a result the estimated labor intensity of technical servicing and repair is increasing. The number of workers engaged in the inspection, adjustment, and all types of repairs of equipment at mines, TSEMM, and ore equipment repair plants has increased 1.3 fold in 8 years and reached 174,000 people in 1978.

One of the decisive factors in the timely maintenance of the work front is the successful activities of installation organizations at mines (sections) and associations (administrations). The USSR Ministry of the Coal Industry now makes decisions on all problems in the administration of these organizations and in the payment of labor. It is essential to more rapidly organize this service, supply it with installation and transport equipment and tools, train people, and achieve rapid and high quality installation and removal operation of equipment. Associations should develop and unswervingly implement schedules for the introduction of work faces, and coordinate them with planned rates of tunnelling operations, the equipment repair plan and the installation schedule, indicating the sources of equipment and when it will arrive for installation. The schedules should specify the prompt introduction of work faces, not later than two-three months priod to the assumed date of work completion at the face being abandoned.

In discussing the number and utilization of operating work faces, and shortcomings in work organization, one should not forget the experience of progressive brigades which extract 1 000 tons and more coal per day per face. About 500 brigades in 1978 extracted 189.2 million tons of coal (44.4 percent of total extraction from work faces). This includes 85 brigades which extracted from 500,000 to 1.2 million tons each. In these collectives the discipline and good organization of brigade members ensures high levels of work time utilization. They have lower accident rates and less idle time.

The work experience at the Mine imeni Kostenko in the Karaganda basin deserves extensive study and general application. It has organized the extraction of 600,000 tons of coal annually from each work face and has introduced plans for the scientific organization of labor in order to increase loading levels to 1,000 tons of coal per shift. The sector now has 50 mines where 1,000 tons and more per day are loaded at each face.

It is possible and essential to organize such operations at each integrated mechanized face at every mine. This is one of the most important obligations of section, mine, and association managers. One should keep in mind that in addition to improving production indicators, the "thousandeer" movement also forms the moral values of the new person, having high skill levels and work standards, and showing discipline and creative initiative.

There has recently been a successful retardation of the process of reducing the amount of tunnelling and the number of work faces (especially in the Ukrainian SSR Ministry of the Coal Industry's mines). Paths for the future technological modernization have been outlined: The use of mechanized pit props with increased working strength of the type UPK, OKP-70 (Fig. 2) KM-130, KD-80, and KMT (Fig. 3); the transition to base conveyors, heavy tunnelling machines and complexes, high capacity VM-12 and VTs-7 ventilators, x monorail lines for moving people and materials.

Improved drilling equipment, more powerful belt conveyors, electric locomotives and other equipment are being developed and prepared for series production. Equipment is being developed to mechanize the exploitation of inclined and steep beds with blocked spatial structures. Hydroextraction and planing extraction have considerable promise with respect to already developed equipment for coal cutting and transportation. All these progressive solutions are used in new systems.

The improvement of equipment, the increase in the unit weight of highly productive machinery, the expansion of spare parts production, improved standards of mining equipment technical servicing, the reduction of idle time due to organizational reasons, and the use of efficient bed degasification and air conditioning all make it possible to increase the average loadings at integrated mechanized faces and the number of "thousandeer" brigades. This is even inspite of deteriorating mining engineering conditions with respect to gas content, rock pressure and temperature.

The main problem in improving production efficiency at mines is, while fulfilling the mining operation development plans, to introduce work faces strictly on schedule, create reserve frontage, reduce idle time and ensure the fulfillment of plan targets for coal extraction per work day.

In the past 10-12 years there have been marked changes in the amount of equipment for tunnelling work using combine, loading, and drilling machinery (Table 4 ). As a result of the partial modernization of equipment, the

Table 4.

| | 1965 | 1970 | 1975 | 1977 | 1978 |
|---|---|---|---|---|---|
| USSR Ministry of the Coal Industry | | | | | |
| Tunnelling combines | 525 | 895 | 1,402 | 1,621* | 1,659 |
| Loading machines | 6,199 | 4,508 | 4,411 | 4,506** | 4,555 |
| Drilling machines | 192 | 405 | 721 | 1,004 | |

*The share of combines in tunnelling operations increased from 6.7 to 36.3 percent.

**

**The percentage of loading machines with 1 PNB-2 and 2 PNB-2 raking teeth increased to 37.5 percent

total productivity of the tunnelling machinery stock increased 1.3 fold, and as a result, labor intensity of preparatory work was dreduced by 18-20 percent.

It would seem that improvements in the technical base would have lead to marked improvements in tunnelling work results. However, this has not occurred. There have been no substantial increases in the pace of such work and labor productivity of tunnelling workers has declined.

As noted above, the reduction in shaft and drift excavation volumes is to a large extent dictated by the introduction of more modern systems and the planned reduction in the number of work faces necessary for operations.

The transition to pillar free extraction and the use of the drop and restoration method of working walls have permitted a sharp reduction in preparatory driving and the total volume of underground working. As a result, there has been a steady decline in the unit volumes of driving from 22.8 meters per 1,000 tons in 1965 to 13.7 in 1977, indicating the systematization of mining operations.

At the same time, in a number of cases reductions in driving volumes is the result of associations failing to fulfill driving operations plans. This is due to reductions in the volumes of capital investment operations carried out by the associations' own efforts. In 1965 the average rate of tunnelling was 70 meters per month. At that time the 100 meter mark was reached by tunnel workers in the Kuznets and Karaganda basins and in Voroshilovskaya Oblast. This was in face of almost a complete lack of combines, highly productive loaders and drills. In 1970 the rate was reduced to 64.5 meters per month, and in 1977 it increased to 72.8. During these seven years labor productivity declined from 0.27 to 0.21 meters per shift.

Preparatory driving is one of the most important processes in the underground exploitation of coal deposits. Because of a deterioration in organizational standards it cannot completely meet the requirements of production efficiency and cannot support the planned work frontage. At many mines intrashift idle time has increased, the number of work days per month on preparatory faces has declined to 16-17, part of tunnellers work time is spent on extraneous work on reproping tunnels, installing and removing equipment, and other work not directly involved with driving new tunnels. Average brigade size is 18.3 people, or 7-12 less than called for by norms.

Tunnelling combines now work on an average 15-18 percent of total calandar time. There is no justification for this waste. Therefore the efforts of mine and association workers and managers of all ranks should be directed towards the introduction of flow sheets for work processes at each face, and towards the reduction of idle time both within shifts and during the month.

One should also note that the transfer of mining operation planning functions to associations (Kombinats) has entailed a reduction in exactitude and responsibility for the fulfillment of the basic indicators of tunnelling operations. The technical directors of associations worked out an operational plan for tunnel driving in 1978 that turned out to be 102.5 kilometers less than the annual program. Numerous reductions in annual plan indicators were allowed in a number of associations.

In order to improve discipline in the strict observation of mining engineering plans established by the USSR Ministry of the Coal Industry, one of the measures should be the approval of annual targets for tunnelling operations, the availability of operating and reserve frontage, and the magnitude of loadings at operating work faces.

However, in addition to organizational shortcomings there are also objective factors which complicate tunnel diggers' work. There has been an increase in the more difficult opening and preparatory operations ( field, sloped and with large cross sections, for which there is not sufficiently productive equipment. There has also been an increase in the volume of work done under conditions of increased presence of gas and the danger of explosion. This has lead to approximately a 35 percent increase in their labor intensity.

In addition, there are a number of factors which delay face movement and increase labor costs: Shortages of equipment for auxiliary transport, low power and productivity of drills, high labor intensity of prop installation, and the insufficient power of local ventilators do not permit conducting mine work at accelerated rates necessary for the preparation of lengthened extraction areas meeting the requirements of modern equipment.

There are already technical solutions to eliminate these and other shortcomings. Distinct difficulties are arising only in the mechanization of the propping process. Therefore, everything depends upon an increased production volume by machine building plants, which, in the immediate future, must organize the production of equipment in the quantity necessary for the coal industry. Also, much depends upon the skill of technologists in developing more improved methods of uncovering areas for extraction, making maximum use of the general mine depression to ventilate workings over a considerable distance and to supplement drafts with the use jof ventilation shafts. The selection of a rational cross section has a substantial role in improving ventilation and maintaining mine operations. In the past 10 years cross section dimensions have increased 25.5 percent and in 1977 were 6.6 square meters. The use of increased cross sections (16-20 square meters) in the USSR and abroad shows that increases in extraction of rock and expenditures for prop materials are economically justified in the operation of mining networks through reductions in depression and expenditures for maintenance.

Back in 1973 it was recommended to increase (up to 12 square meters) t ʌ cross sections of tunnels adjacent to work faces. There are 13 standard cross sections developed by Tsentrogiproshakht and Yuzhgiproshakht. In 1977 the "Instructions on the Protection and Maintenance of Mine Workings" was put into effect. However, it is far from always used by technical services in planning mine operation development, especially in section tunnelling. The modern idea of the efficiency of production final results requires increased demands towards developing and comparing parts of the process of mine enterprise f development and preparation with regard to the entire operational s,stem.

In view of these demands, special importance is placed upon the selection of mining areas, prop design and materials, cross section size, the types and arrangement of transportantion equipment, both for the transport of rock and coal, and for supplying materials and equipment. This selection is made upon the basis of the abundance of gas in the coal beds being developed, the degree of pressure, the nature of the displacement and strength of the surround ing rock (especially in the move to deeper horizons), and also depends upon the mechanization, mining, and transport methods selected.

The essence of such studies consists in selecting the optimal standard solutions ensuring the maximum use of mining machine productivity, maintaining operations without repairs, and further improving underground work safety.

The IGD [Mining Institute] imeni A. A. Skochinskiy, VNIMI [All Unsion Scientific Research Institute of Mine Surveying] DonUGI [Donetsk Scientific Research Institute of Coal], and other basin institutes are conducting serious research in the area of rock pressure, new principles of rock failure, propping, and are developing new standard cross sections. However, this work should be accelerated so that mine and association workers can more rapidly obtain practical recommendations. For example, in order to increase the stability of tunnels, and improve operation safety, reduce the escape of air and the resistance of air flow in the immediate years ahead it will be necessary to organize the extensive utilization of anhydride or gypsum as a filler of the free space behind props and as materials for raising the areas near the drifts, protecting workings from the worked out in a dense system of thin beds or to maintain workings using the pillar free method of workings. Scientific research, planning and design organizations should solve this problem following the program ratified by the USSR Ministry of the Coal Industry and rapidly develop processes and equipment for using anhydride in operations, and to design the necessary machinery. Plants producing coal machinery and ore equipment repair plants should organize their production.

Inspite of the existing jspecific difficulties in tunnelling technology, modern equipment permits a significant increase in tunnel driving rates compared to those actually attained. Above all, the experiences of highly productive tunnelling brigades should be more widely and actively disseminated. In 1978, 385 brigades (less than 10 percent of the total) drilled 1,118 kilometers of tunnel at an average rate of 245 meters per month. This is 28 percent of the total volume of opening and preparatory work. Among these brigades outstanding results have systematically been achieved by the brigades of N. M. Romantsov and L. S. Solov'yev in the Kuzbass, A. A. Kubaychuk and M. P. Kurnikov in the Karaganda Basin. Using combines, they have attained driving rates averaging 500 - 1 800 per month. The brigades of I. V. Skryabin and I. Ye. Tomchuk in the Donbass, working thin beds by the drill and blast method and using loading machines, have rates of 300-310 meters per month. Each association has brigades showing good results. It is the duty of mine and association managers to do everything necessary for every brigade to attain high tunnel driving rates.

An important place among modern mine management methods should be held by the general mine production organization schedule developed on the basis of general technological cartograms for integrated mechanized faces, the assumed work conditions, schedules for the movement of transport equipment, the operation of lifts and other equipment. This schedule has the goal of liquidating idle time of work and preparatory faces.

One of the measures for reducing idle time of tunnelling brigades is to reduce the time they spend on preparatory operations. In order to do this, many mines have seen the creation of more than 380 special brigades which are engaged in propping, outfitting tunnel entrances, installing tunnel driving equipment, and completely preparing the face for work operations. Such brigades should be organized everywhere, using the most qualified tunnel drivers and paying appropriate wages for their labor.

Comprehensive brigades with an increased number of workers and using the brigade contract method could be used for the preparation of extraction sections for all workings and for delivering and installing equipment. Such a form of work presumes the centralization of rigging work, an improved level of equipment utilization, and eliminates the diverting of tunnelling workers to auxiliary operations, as well as increases brigade members' material incentives.

In supervising the preparation of new horizons and the fulfillment of annual mining operations programs, one can see the effects of a lack, at various management levels, of sufficiently operational methods of tracking the origin of deviations from plans. As a result of this responsible persons and services are deprived of the possibility of promptly taking the needed measures.

In order to provide for the reliable control over the course of work face introduction and abandonment, VNIIUgol' has developed the: "Complex of Problems in Evaluating the Timeliness of the Reproduction of Extraction Work". Software and instructions for computer solutions have been sent to production associations. It is important that these developments be more rapidly introduced and utilized to solve practical problems in the management of preparatory operations.

The main tasks of our designers, planners, and especially the developers at TSNIIpodzemmash [Central Scientific Research Institute for Underground Machinery], the Uglemekhanizatsiya Scientific-Production Association and other leading institutes is the creation of comprehensive mechanized tunnelling equipment to reduce the labor intensity of propping, tying down walls and roofs, switching railcars, laying track and other operations conducted manually during tunnelling operations using combines or the drill and blast method.

Another direction should be the continuation and intensification of work oondeveloping mechanized tunnelling complexes of the type "Soyuz-19" (Fig. 4). KR-2, "Sibir'" (Fig. 5). These are machines with higher technical standards, intended for work on mixed faces, on solid rock, and on sloped workings. It is essential to see to their wide introduction. Simultaneously with the development of complexes there should be a solution to the problem of replacing conveyor and rail transport during operations using self-propeller equipment.

In April 1979 there was a zonal conference of managers of associations, mines, and sections, tunnelling brigades, and specialists on problems of the state and development of the technology, processes, and organization of tunnel driving operations. The measures worked out at this conference should be the basis of all production work at coal mines

In order to increase mine production efficiency, the main tasks of workers at all management levels should be, while organizing mine operation work in strict accordance with annual plans and deadlines for work frontage preparation, to ensure the supply of equipment to preparatory faces in accordance with flow charts to make provision for increasing the cross section of workings in plans and technical data, improve the organization of tunnel driving work and reduce idle time, increase the level of comprehensive mechanization of main and auxiliary operations, and upon this basis increase the speed of movement of preparatory faces, and increase the labor productivity of workers engaged in underground operations.



11,574
CSO: 1822

## CENTRAL ASIAN COAL MINING DISCUSSED

Tashkent PRAVDA VOSTOKA in Russian 26 Aug 79 p 1

[Article by A. Leleko, General Director of the "Sredazugol'" Production Association: "The Source of Light and Heat"]

[Text] Today our country is celebrating a traditional annual holiday--Miner's Day--which was established as a token of great respect for the labor of our miners who bring us all heat and light.

During the 9th and three years of the 10th Five-Year Plan the extraction of coal in Central Asia increased by 2.4 million tons, or by 28.6 percent. This is an average indicator. Higher development rates were achieved by the coal industry of the Usbek SSR where from 1970 through 1978 extraction increased from 3.7 million to 5.6 million tons, or by 49.1 percent.

Competing for a worthy celebration of their holiday, the collectives of the coal mining enterprises of the "Sredazugol'" Association fulfilled their eight-month coal mining plan for the association as a whole on 22 Aug, and for the Usbek SSR on 17 Aug. It has to be noted that the stable fulfillment of plans is the result of the re-equipping of all of the production elements of the branch. During the period from 1970 through 1978 underground coal mining with the help of narrow-width combines increased to 2,305,000 tons, that is, increased by more than 2.3 times. At the Angrenskiy Mine No. 9 60 to 65 percent of all of the work is performed with the help of sinking combines of the 4PU type.

The level of the mechanization of production processes is very high at the largest coal mining enterprise of Central Asia--the "Angrenskiy" pit where highly productive stripping and mining equipment and modern transportation equipment is used.

The socialist competition of workers in the leading occupations of the branch in underground and open work which has become widely developed in the coal industry is an important means of increasing production efficiency and improving the organization of labor. High results are being achieved by the collectives of the teams of I. Medvedev--the "Severnaya" mine,--

V. Tkachenko--Mine No. 8,--N. Yaroshenko--the "Kok-Yangak" Mine,-- and A. Akhmatov and A. Gareyev--Mine No. 9.

Almost 50 highly productive teams are working at the association's pits and open sections. At the "Angrenskiy" pit the best results have been achieved by the excavator teams of R. Urmanov, A. Niyazmatov, B. Fadeyev, M. Khalilov, Kh. Umarov, A. Makhkamov, and N. Mel'nikov. They have overfulfilled the socialist commitments which they adopted for Miner's Day. Successful work is being done by the locomotive teams which are led by V. Letov, A. Artser, V. Misyuk, and V. Shmel'kov and by the truck driver team under the leadership of A. Bogdanovich.

The miners have a good tradition--not only to total up their results before their holiday, but also to map out ways for further growth. And the branch's prospects are impressive. In Central Asia it is planned to increase the extraction of coal to 22.2 million tons, that is, by more than 2 times; in addition, a course has been taken aimed at expanding the extraction of coal by the open method, which applies chiefly to the Uzbek SSR. It is planned to increase the capacity of the "Angrenskiy" pit. The reconstruction of this pit is connected to the construction of the Novo-Angrenskiy State Hydroelectric Power Station with a capacity of 2.4 million kilowatts and the importance of its development is urgently dictated by the existence at the Angrenskiy deposit of a number of useful components which are being worked as by-products of coal.

Our miners are celebrating Miner's Day with a feeling of great responsibility for the further progress of our economy and for the accomplishment of the difficult task set for them by the party and people.

2959
CSO: 1822

## DECREASE IN PAVLOGRADUGOL' PRODUCTION

Kiev RABOCHAYA GAZETA in Russian 8 Sep 79 p 2

[Article by G. Baronenko, engineer, Pavlogradugol' Production Association: "Why the Complex Is Hobbled"]

> [Text] Almost all the collectives of miners in the Dnepropetrovsk region have supported the initiative of leading coal extraction brigades working in thin seams. Many brigades in the Western Donets Basin have promised to increase the load per longwall to 700 tons, and to 1,000 tons for strata of thicker than one meter. They are close to attaining this. According to last year's results the average load per longwall equipped with mechanized complexes at the Pavlogradugol' Production Association was 560 tons.
>
> A certain decrease has been observed in work at the association recently, however. In July of this year alone coal workers in the Dnepr region fell 73,000 tons short for energy coal. They failed to fulfill several other technical-economic indexes. What is going on?

No, the miners of this young and promising basin have not lost their skills. They are becoming more skillful every day. Equipment loads have reached a maximum. And from this standpoint the factors that prevent them from working even better are clearly visible. It is true that mining geological conditions in the basin have become much worse and therefore the equipment trouble rate has increased, but this is not the only problem. The miners have no excavation equipment for thin, gently sloping seams, so in most walls we are forced to cut ground rock as well. This significantly worsens coal quality and reduces the working life of equipment to one-third.

Under conditions of heavy flooding and constant cutting into side rock the chains and other parts of scraper conveyors only last for two

months of work. Then the worry begins. In the first half of this year alone we have had more than 200 shutdowns of the wall because of scraper chain breaks and about 1,000 hours of working time have been lost. The breakdown rate for the primary excavation device in the basin, the MK-67 coal extraction combine, continues to be high because it does not have a water-cooled engine. More than 1,000 working hours were lost for this reason in the first half of the year. Meanwhile series production of the engine has not been organized and the actual process of replacing a unit that has broken down is very labor-intensive. Machine operators have significant complaints about low quality work by Voroshilovgrad repair workers. Losses of working time could be greatly reduced if we had a stock of reserve equipment. However, the association chronically suffers from difficulty getting basic mining equipment and spare parts for it. Extraction of coal by mechanized complexes has increased 14 percent here, but the allocation of spare parts per thousand tons of extraction has gone down considerably. Plants do not even provide the allocated supplies. The Gorlovka Machine Building Plant imeni Kirov, for example, delivered only 58,000 rubles worth of spare parts in the first six months where the plan called for 300,000 rubles. Supply of drive shaft gears, sprockets, and bevel gears is completely inadequate. In the first six months the plant has not supplied a single actuating member for the combine, even though 10 were expected.

More than 20 actuating members that do not work have piled up at mines of the association, but we do not have our own repair facilities and we have nowhere to send them for repair. Indeed, this is not just a problem for us; the same thing is true throughout the sector. Working time is lost because inadequate numbers of fast-wearing chains of scraper conveyors are allocated. About 70 primary 1L-100K and KL-1.5 conveyors are in use at mines of the basin, but we have only one electric motor in reserve and no reducer gears.

Inadequate supply of spare parts, metal supports, electric locomotives, towing winches, and conveyors for sinking mine excavations greatly curtails the rate of digging and slows down the development of mining work. Longwall 831 at the Pavlogradskaya mine has been prepared for excavation since April, but no work has been done for lack of a mechanized 1MKM complex. Another wall at the same mine was rigged up using equipment that had already worked its full service life; the miners exhausted themselves with breakdowns and the equipment was soon completely unusable. Workers at the Blagodatnaya mine setting up a wall had to hunt for and bring in sections of Donbass reinforcement from several different associations of the ministry.

The miners really do not have proper equipment for "beznishevaya" ["without niches"] excavation. This slows down growth in labor productivity and continues unproductive, labor-intensive processes. The miners have raised this question with designers and machine builders numerous times. In particular, on 1 March 1978 RABOCHAYA GAZETA ran an article entitled "Where Is the Series Produced Unit?" in which the

collective of the experimental section of the Yubileynaya mine argued convincingly for the wisdom of series production of the KD-70 complex. Time is passing, but the unit, needed today, is still on the drawing boards.

Operations workers also have serious complaints about the mechanical quality of the materials used to manufacture many parts and assemblies of mining equipment. If their strength and wear-resistance were increased only slightly there would be a great reduction in losses of working time. This applies to the chains of scraper conveyors, the drive gears and drive sprockets of combines, and to other parts. The use of certain experimental models shows strikingly that reliable materials are needed.

The miners of the Western Donets Basin face difficult tasks. They are not afraid of hardship, and they have considerable experience. This is confirmed by the heroic labor of the highly productive workers of the brigades of Ye. Koshelev, I. Duradazha, and N. Pakshin and drilling masters I. Glukhoded, N. Romanov, V. Zhumarnyy, and others. Their great skills cannot be used fully without new equipment.

11,176
CSO: 1822

## ALMAZ COAL COMBINE MACHINE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Aug 79 p 2

/Article by M. Mukushev, Doctor, Technical Sciences, Deputy Director, Karaganda Scientific-Research Coal Institute; L. Markman, Candidate, Technical Sciences, Director, Institute Sector; V. Klimov, Candidate, Technical Sciences, Docent of the Karaganda Polytechnical Institute; V. Yarema, Professor, Department Head of Department, Institute for Improving Qualifications of USSR Ministry of the Coal Industry Managerial Personnel: "When Will The "Almaz" Arrive At The Face?"/

/Text/ This question has been posed numerous times for scientists by the miners from Karaganda, Ural, Zapolyar'ye region, where tests were successfully carried out in the shafts and pits of experimental prototypes of the rock-drilling combine "Almaz", the (4PP-6).

"An excellent machine, it cuts large rocks like a knife cuts through butter", is how one of the tunnelers from the "Abayskaya" mine characterized our machine. And this is actually so. Th combine, built by collectives from the Karaganda Scientific-Research Coal, the Karaganda Polytechnical Institute with the assistance of scientists from TsNIIpodzemmash, the Institute for Mining imeni A.A. Skochinskiy, and also the Karagandshakhtostroy combine has no counterpart either in our country or abroad.

Currently, drilling-type combines are used for mine workings. They are quite huge (weight exceeds 200 tons), uneconomical, and difficult to control. High tunneling rates cannot be achieved using them. The deficiencies of these machines have caused the mines to run primary workings not through rock, but coal. This occasions great loss of fuel (large areas must be left under protective pillars). Workings run through coal are transient in nature, they rapidly are retired, and must be reinforced frequently, requiring the expenditure of considerable resources.

The "Almaz" combine has advantageous differences over drill type

machines. It weighs 32 tons. Tunnelers' working conditions improve considerably with the use of this unit. Their work becomes more productive and safer, and tunneling rates through large rock formations increases by a factor of 2.5.

The "Almaz" is capable of breaking through practically any rock. It is based upon the combined principle of operation. With a special disc equipped with diamond segments, fissures are cut in the coal stratum. The cut out segments with large cuts are then separated from the solid mass by hydro-separators. This combine can be used not only in the coal industry, but in the ore industry as well, and also in the tunnel-building area, and the construction of special hydro structures.

The efficiency and promise of our machine have been proven. But to offer an intelligent response to the production workers query as to when the "Almaz" will arrive at the face, we cannot, simply because we ourselves do not know when this will take place.

As soon as the combine underwent testing and received good responses, its builders immediately requested the USSR Ministry of the Coal Industry (Minugleprom) to arrange series production for the unit. We were given the explanation, however, that at this time, the machine builders were not capable of accomplishing this task: there was no enterprise capable of mastering the mass production of this combine. The Kopeysk Machinebuilding Plant imeni Kirov is building a shop for the production of heavy tunneling machines of the boom type, but it will not go into operation before 1984.

That means a wait of five years. But the combine is needed now, today! We then requested the assistance of the directors of the Yasinovataya Machinebuilding Plant of the Ministry of Heavy Machinery. Afterall, the base machine used for the production of the "Almaz" was the series produced tunneling, boom-type 4PP-6 combine, produced by this plant. To obtain the version we sought, it was necessary to manufacture a new actuating element--boom and "tie" it to the 4PP-2 combine. In our view, such a decision permits, on the one hand, use of the series produced combine 4PP-2 in the conditions it was designed for (rock with a rigidity coefficient up to 6 units) and on the other hand, the same machine, equipped with the diamond disc, can be used in tunneling workings through rock having average tensile strength and hard rock (with a tensile strength of 7--12).

It would not be difficult for the Yasinovatskaya Plant to organize production of the new combine primarily because the base machine is already being produced. Secondly, this plant is capable of making replaceable working elements of the diamond-separating action type and delivering them to the mines with the 4-PP2

combine. Thirdly, this would permit a broad expansion of the utilization sphere for the series produced machine without considerable capital expenditures and re-tooling of production.

The Yasinovatskaya Plant collective viewed our request with understanding. They agreed here to manufacture during the 1980-81 time frame an experimental consignment of "Almaz" combines, with one condition, that in the series production of the diamond discs, another enterprise be tasked with this function. This problem too was quickly solved. The Kabardinka-Balkarsk Diamond Tool Plant agreed to produce the special design cutting discs for the 4PP-6 combine. The USSR Ministry of the Coal Industry Technical Administration was prepared to finance these operations, and the Yasinovtskaya Machinebuilding Plant geared to produce the new equipment, when suddenly the VPO "Soyuzgormash" of the Ministry of Heavy Machinery forbade them to do so.

Quite frankly, we did not expect such a turn of events. The talks, afterall, with the Yasinovatskaya Plant were conducted with the knowledge of Mintyazhmash and even according at the official direction of the ministry (a letter exits on this count from 17 October 1977).

However, when the USSR Minugleprom (Ministry of the Coal Industry) technical administration contacted the "Soyuzgormash" chief engineer, V. Polyantsev, he definitely and clearly declared: "We will not make this machine!"

We are of the opinion that such a position does not produce regard for the directors of the VPO "Soyuzgormash".

8851
CSO: 1822

UDC 665.637.84.001.5; 539.214

# PREPARING OPTIMAL RAW MATERIAL FOR BITUMEN PRODUCTION

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 9, Sep 79 11-14

[Article by V. V. Fryazinov, R. S. Akhmetova, and L. V. Yevdokimova, Bashkir ASSR Scientific Research Institute of Petroleum Refining: "Technique for Obtaining Bitumens with a Broad Interval of Plasticity"]

[Text] The quality and assortment of bitumens produced in the USSR today does not fully satisfy the requirements of our economy. Such major consumers as the production of soft roofing materials, insulation and hydroinsulation work, the cable industry, and others make especially stiff demands of bitumens with respect to their heat and frost resistance, that is, the ability to maintain a viscous-plastic state in a broad range of temperature fluctuations. The new technical specifications of GOST [State All-Union Standard] 9548-74 for roofing bitumens, GOST 9812-74 for insulation bitumens, and TU [technical specifications] 3810580-75 for "plastbity" [possibly plastic bitumens] envision heightened requirements for the interval of plasticity of the bitumens. The upper limit of plasticity for these bitumens is controlled by the softening point according to the ring and ball method; the lower limit is determined by the brittleness temperature according to Fraas. The difference between the two determines the interval of plasticity of the particular bitumen.

For outside roofing bitumens and plastbits the norm for softening point by KiSh is set at the level of solid construction bitumens according to GOST 6617-76 and the norm for brittleness temperature is set at the level of viscous road bitumens of grades BND according to GOST 22245-76.

To obtain bitumens that combine a high softening point and low brittleness temperature it is necessary to select a definite raw material composition and then oxidate it under appropriate conditions.

This communication sets forth results of studies on the selection of raw material and a refining process that make it possible to obtain solid highly plastic bitumens from commercial West Siberian and Romashkino petroleums.

Studies made earlier in the area of road bitumens have shown that a raw material enriched with lubricating components must be used to obtain heat and frost resistant bitumens. One of the techniques of preparing such raw material is obtaining a residue of lightened fraction composition by vacuum distillation of mazut oil.

Table 1 below shows the quality indexes of bitumens with a softening temperature by KiSh of about 90 degrees C obtained by oxidation of residues of varying concentrations from direct distillation of Romashkino and West Siberian petroleums in a vat and in a tubular reactor (customary conditions).

Table 1. Description of Direct-Distilled Residues of Different Petroleums and Bitumens Obtained by Oxidation

| (a) Сырье | | | (b) Битумы, окисленные | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | (c) в кубе | | | | (d) в трубчатом реакторе | | | |
| Остаток выкипающий при температуре выше (e) | Вязкость при 80°С, с (f) | Температура размягчения, °С (g) | температура размягчения °С (g) | глубина проникания при 25°С, 0.1 мм (h) | температура хрупкости, °С (i) | интервал пластичности, °С (j) | температура размягчения °С (g) | глубина проникания при 25°С, 0.1 мм (h) | температура хрупкости, °С (i) | интервал пластичности, °С (j) |
| Ромашкинская нефть (Romashkino Petroleum) | | | | | | | | | | |
| 350 | 6 | — | 92 | 23 | —6 | 98 | 91 | 46 | —20 | 111 |
| 400 | 30 | 34 | 93 | 17 | +2 | 91 | 92 | 29 | — 9 | 101 |
| 450 | 80 | 36 | 92 | 14 | +4 | 88 | 91 | 22 | — 3 | 94 |
| 500 | 145 | 40 | 90 | 10 | +6 | 84 | 90 | 19 | + 2 | 88 |
| Западносибирская нефть (West Siberian Petroleum) | | | | | | | | | | |
| 350 | 6 | — | 92 | 27 | —14 | 106 | — | — | — | — |
| 400 | 13 | — | 92 | 20 | —10 | 102 | 91 | 38 | —20 | 109 |
| 450 | 31 | 30 | 92 | 18 | +2 | 90 | 92 | 34 | —14 | 106 |
| 500 | 45 | 25 | 91 | 15 | +4 | 86 | 90 | 23 | — 6 | 99 |

Key: (a) Raw material;
(b) Bitumens, oxidated;
(c) In a vat;
(d) In a tubular reactor;
(e) Residue that boils off at a temperature of greater than;
(f) Viscosity at 80°C;
(g) Softening point, °C;
(h) Depth of penetration at 25°C, 0.1 mm;
(i) Brittleness temperature, °C;
(j) Interval of plasticity, °C.

The figures in Table 1 show that regardless of the type of oxidation apparatus the bitumens obtained for low-viscosity raw materials (residue from shallow take-off) are more plastic than those from high-viscosity materials. When a residue with the same concentration is oxidated in both the tubular reactor and the vat, the former produces more plastic bitumens.

An analysis of the quality of the oxidated bitumens [illegible] formity with the requirements of GOST 9548-74 shows that the bitumens from lightened residues correspond to surface grades of roofing bitumens for plasticity. When refining Romashkino petroleum the required bitumen

plasticity is obtained where residues are oxidated that boil off at more than 350 degrees C (in the vat) and above 400-450 degrees C (in the tubular reactor). However, because the residue has a greater content of fractions that boil off at more than 350 degrees C (low-boiling distillate fractions), the bitumens obtained from it frequently do not meet specifications for flash point and weight loss when heated.

The optimal raw material for the production of outer roofing bitumens from West Siberian petroleum of the Samotlor type is residue that burns off at more than about 400-420 degrees C (in the vat) and 480 degrees C (for the tubular reactor).

Practical bitumen production makes broad use of the technology for obtaining bitumens of the required quality that is based on compounding (both for preparation of the raw material and for bringing the base bitumen up to the given quality standard). This procedure employs two or several types of products which are mixed in definite ratios to achieve the optimal raw material or bitumen quality.

It has been established that in the general case the sum of asphaltenes and resins determines heat resistance and the amount of paraffin-naphthene hydrocarbons determines the cold resistance of bitumens. A definite ratio of these components insures the optimal combination of bitumen quality indexes. Many different methods have been proposed for preparation of the raw material and obtaining bitumens based on this principle. Specifically, several types of highly plastic bitumens are obtained in other countries by using oxidation raw material prepared by compounding a residue with heavy vacuum distillates of petroleum distillation. This procedure was used in the prsent project to obtain surface roofing bitumens meeting GOST 9548-74 from commercial Romashkino petroleum.

Tables 2 and 3 below give the characteristics of the initial samples of products and the mixtures used as oxidation raw material.

Analysis of the quality of bitumens with a softening temperature by KiSh of 90 degrees C obtained by oxidation of a 70:30 mixture of residue and vacuum distillates of different fractional composition in a vat (see Figure 1 below) shows: the lower the viscosity of the vacuum distillate, the lower the indexes of depths of penetration of a needle and flash point will be; where the brittleness temperature and changes in the weight and quality indexes of the bitumen are greater after heating the output of oxidated bitumen is less and the output of gas and oxidation distillate is correspondingly greater.

Of the vacuum distillates studied the best-quality fraction is oil fraction IV with provisional boiling range of 450-500 degrees C and viscosity of more than 8.0 centistokes at 100 degrees C. The use of this distillate as a component in oxidated raw material insures the receipt of bitumens with sufficient plasticity while keeping other bitumen quality indexes at a permissible level and producing a large amount of the target product, bitumen.

Table 2. Description of Samples of Products of Commercial Romashkino Petroleum

| Наименование продуктов (a) | $\rho_4^{20}$ | Вязкость, сСт, при (b) 80°C | 100°C | Температура, °C (c) размягчения (f) | вспышки (g) | Фракционный состав, %, мас., выкипает до (d) 350°C | 400°C | 450°C | 540°C | Групповой химический состав, % мас. (e) асфальтены (h) | смолы (i) | масла (j) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ходовой гудрон (k) | 0,987 | 38 | — | 30 | 293 | 0 | 2 | 9 | 29 | 5,7 | 29,4 | 64,9 |
| Вакуумный погон: (l) | | | | | | | | | | | | |
| 1 | 0,904 | — | 4,2 | — | 172 | 23 | 63 | 96 | — | 0 | 3,4 | 96,6 |
| 2 | 0,911 | — | 5,2 | — | 204 | 20 | 57 | 93 | — | 0 | 3,4 | 96,6 |
| 3 | 0,967 | — | 8,6 | — | 242 | 1 | 9 | 35 | 467 | 0 | 7,0 | 93 |

Key: (a) Name of products;
(b) Viscosity, centistokes, at;
(c) Temperature;
(d) Fraction composition, percent by weight that boils away before;
(e) Group chemical composition, percent by weight;
(f) Softening;
(g) Flash point;
(h) Asphaltenes;
(i) Resins;
(j) Oils;
(k) Marketable residue;
(l) Vacuum distillate.

---

To select the optimal amount of vacuum distillate mixtures of residue with 10, 30, and 50 percent heavy vacuum distillate and viscosity $\nu_{100}$ = 8.6 centistokes were put together (see Table 3 below).

Figure 2 below compares the characteristics of bitumens with a softening temperature KiSh of about 90 degrees C obtained by oxidation of the initial residue and mixtures in a vat and a tubular reactor.

Analysis of these data indicates that the greater the amount of vacuum distillate in the mixture, the greater the depth of needle penetration at 25° C will be and the lower the brittleness temperature and output of oxidated bitumen will be. In this case the bitumens obtained by oxidation in the tubular reactor have higher plasticity than the bitumens from the vat. Therefore, in the tubular reactor the required bitumen quality is achieved with a significantly lower content of vacuum distillate in the oxidated mixture. For example, whereas bitumen with depths of needle penetration at 25 degrees C = 30 and softening temperatures by KiSh of 92-93 degrees C is obtained in the tubular reactor by oxidation of a mixture of residue and 10 percent vacuum distillate, the same quality of bitumen can be obtained in the vat by oxidating a mixture containing 50 percent vacuum distillate. It thus follows that the optimal raw material for obtaining surface roofing

Table 3. Description of Mixtures of Residues with Different Amounts of Heavy Vacuum Distillate from Romashkino Petroleum

| Показатели (Indexes) | Исходный гудрон (a) | 30% вакуумного погона (b) с $v_{100}$, сСт | | | (c) Вакуумный погон с $v_{100}$ = 8,6 сСт, % | | |
|---|---|---|---|---|---|---|---|
| | | 4,2 | 5,2 | 8,6 | 10 | 30 | 50 |
| Плотность, $\rho_4^{20}$ (d) | 0,987 | 0,959 | 0,961 | 0,967 | 0,979 | 0,967 | 0,956 |
| Вязкость при 80°С (e) | 38 | 6 | 7 | 9 | 22 | 9 | 6 |
| Температура °С (f) | | | | | | | |
| размягчения (g) | 30 | 20 | 26 | 28 | 30 | 28 | 27 |
| вспышки (h) | 293 | 226 | 228 | 256 | 280 | 256 | 250 |
| Фракционный состав, % выкипает до (i) | | | | | | | |
| 350°С | 0 | 8 | 2,5 | 0 | 0 | 0 | 0 |
| 400°С | 2 | 20 | 21 | 2 | Следы (o) | 2 | 8 |
| 450°С | 9 | 35 | 30 | 25 | 10 | 25 | 41 |
| 500°С | 29 | 54 | 55 | 52 | 40 | 52 | 59 |
| Групповой химический состав, % мас. (j) | | | | | | | |
| асфальтены (k) | 5,7 | 4,9 | 4,5 | 4,4 | 5,3 | 4,4 | 3,8 |
| смолы (l) | 29,4 | 22,8 | 21,5 | 21,2 | 26,6 | 21,2 | 16,6 |
| масла (m) | 64,9 | 72,3 | 74 | 74,4 | 68,1 | 74,4 | 79,6 |

Key:
(a) Initial residue;
(b) 30% vacuum distillate with $v_{100}$, centistokes;
(c) Vacuum distillate with $v_{100}$ = 8.6 centistokes, %;
(d) Density;
(e) Viscosity at 80°C;
(f) Temperature;
(g) Softening;
(h) Flash point;
(i) Fraction composition, percentage that boils away before;
(j) Group chemical composition, percent by weight;
(k) Asphaltenes;
(l) Resins;
(m) Oils;
(o) Traces.

---

bitumens that meet GOST 9548-74 from Romashkino petroleum is a mixture of residue and vacuum distillate (oil fraction IV) in which the proportion of the latter is 10-20 percent for oxidation in a tubular reactor and 50-60 percent for oxidation in a periodic-action vat.

This procedure for preparation of raw material may be used to obtain other types of highly plastic bitumens as well, for example plastbit, whose quality is not assured following the conventional technology of bitumen production.

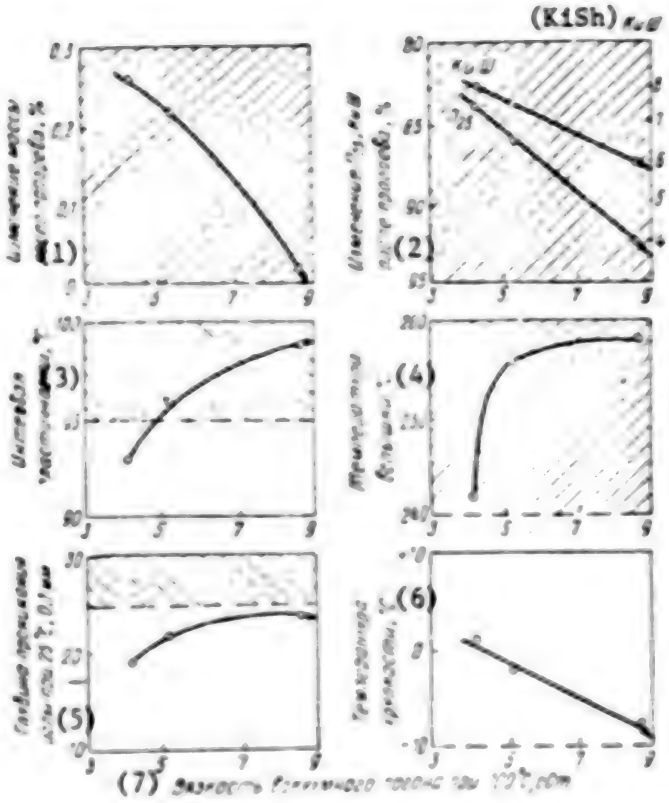



Figure 1. Change in the Properties of Bitumens Depending on the Type of Vacuum Distillate in the Oxidated Mixture (---Requirements of GOST 9548-74)

Key:
(1) Change in weight after heating, %;
(2) Change in $П_{25}$, KiSH after heating, %;
(3) Interval of plasticity, °C;
(4) Flash point, °C;
(5) Depth of needle penetration at 25°C, 0.1 mm;
(6) Brittleness temperature, degrees°C;
(7) Viscosity of vacuum distillate at 100°C, centistokes.

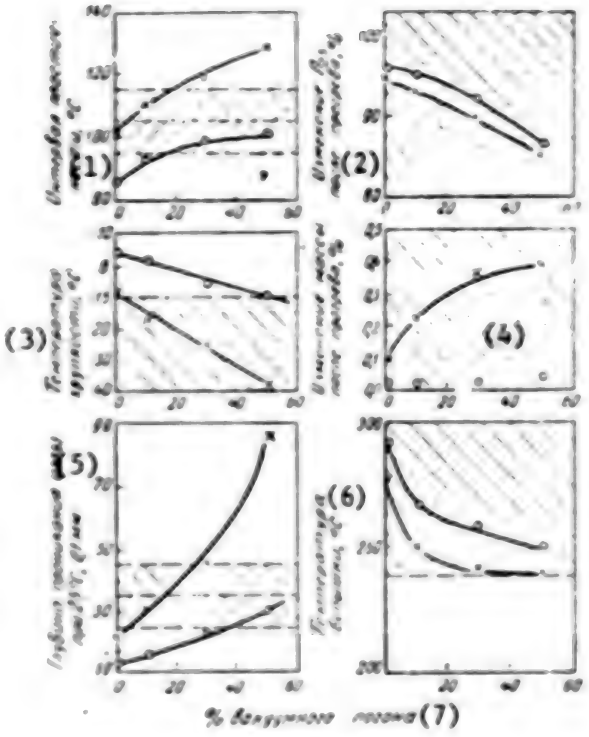



Figure 2. Change in Properties of Bitumen Depending on Amount of Vacuum Distillate in the Oxidated Mixture (---Requirements of GOST 9548-74; o — in vat; x — in tubular reactor)

Key:
(1) Interval of plasticity, °C;
(2) Change in $П_{25}$ after heating, %,
(3) Brittleness temperature, °C;
(4) Change in weight after heating, %;
(5) Depth of needle penetration at 25°C, 0.1 mm;
(6) Flash point, °C;
(7) Percent of vacuum distillate.

## NEW DECREE ON THE DELIVERY OF PETROLEUM PRODUCTS

Moscow EKONOMICHESKAYA GAZETA in Russian No 36, Sep 79 p 24

[Article under rubric "New Official Materials": "Deliveries of Oil Products"]

[Text] In Decree No 33/10, USSR Gossnab and USSR State Arbitration Committee have stipulated the Basic Conditions governing deliveries of oil products to consumers by the oil supply and marketing organizations. These conditions specifiy the plan terms and procedures for concluding delivery contracts, quantities, quality, and delivery times, settling of accounts, return of tare, specificities of inter-republic deliveries, and property liability.

It is stipulated, in particular, that changes in the distribution of oil product funds to the various union republics can be made, when necessary, by the fund-holding ministries and departments through Soyuzglavneft' [USSR Gossnab Main Administration for the Supply and Marketing of Petroleum and Petroleum Products] not later than 50 days before the beginning of the delivery period (quarter, month).

At the discretion of the main administrations for the supply and marketing of petroleum products in the union republics or the territorial petroleum supply and marketing administrations subordinate to them, contracts can be concluded directly between the bulk petroleum depots and the buyers for the delivery of oil products to them. Contractual relations among the supply and marketing organizations can be instituted by having the various parties accept for execution excerpts from plans of inter-republic deliveries.

For checking the quality of oil products delivered by through-routing, the recipient takes samples by procedures stipulated as follows: On receiving liquid or bulk oil products at the station of destination, samples are taken from tank cars, cars, or vessels before unloading; on receiving packaged oil products from transport organizations, samples are taken not later than 24 hours after arrival. If the products are forwarded from petroleum depots (packaging points), the control samples are taken from the tank.

In through-routing shipments, if the transport documents do not have papers concerning the quality of the products attached, the shipper is to be fined.

Sanctions are also established for failure to return tare on time or for delays in sending the necessary documents.

To the Special Conditions is appended a Directive concerning procedures and timetables for the return of metal oil product containers.

6854
CSO: 1822

FUELS AND RELATED EQUIPMENT

NEW SOVIET FLOW HEAD

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Sep 79 p 1

[Article, photo and caption]

[Text] The first Soviet-made floating rig "Baky" is being used for exploratory drilling at great depths. Three wells have been developed since it has been in operation. The Baky collective bears the proud title "Best Rig in the Ministry of Petroleum Industry."

[Caption] Flow head being installed by drilling foreman Sh. Aliyev's crew.

6854
CSO: 1822

## NENETS OIL EXPLORATION CONTINUES

Riga SOVETSKAYA LATVIYA in Russian 25 Jul 79 p 1

[Article, photo and caption]

[Text] In the harsh climate of Nenets Autonomous Okrug, washed by the waters of the White, Barents, and Kara seas, timber logging and natural gas extraction are being done, and oil and other minerals are being looked for.

[Caption] Drilling the latest deep well. Workers of the Nar'yan-Marskaya Oil Exploration Expedition at work.

6854
CSO: 1822

## PAVLODAR PETROLEUM REFINERY DESCRIBED

Moscow PRAVDA in Russian 19 Sep 79 p 1

[Article by Yu. Sokratov: "Towers in the Steppe"]

[Text] In that place where several years ago the Priirtysh steppe came up to the northern edge of Pavlodar a large new enterprise has grown up. Columns, towers, and smokestacks have risen up over an enormous territory and gigantic reservoirs have appeared. This is how Kazakhstan's largest petroleum refining plant, which in time will become a petrochemical combine, looks today.

In the middle of last year construction workers delivered its first stage--56 buildings and structures. The young enterprise's collective mastered the new capacities in advance and is producing quite a bit of valuable output. At the plant petroleum is turned into first quality gasoline, diesel and boiler fuel, and liquid gas. Sulphur is also extracted from it.

The competition is becoming more intense for commissioning the start-up installation for the production of bitumen--a second stage object. Its productivity is a half million tons of finished output per year.

The construction workers long ago prepared for delivery a battery consisting of five oxidizing columns, a boiler room, a technological pumping building, and other installations. Among the collectives of installation workers the competition is being led by the overall teams of mechanics of the communist A. Zhinov, and also of F. Kharlamov and P. Markevich. They are close to fulfilling their team five-year assignments.

The vacuum column has risen to a height of 40 meters. Alongside are open-work metal structures--a kind of shelving on whose "shelves" almost all of the equipment of this main center of the bitumen installation has already been installed. The start-up is supposed to take place this month. But at the finish the work came to a halt.

"The client and, that means, the installation workers," says A. Zhogov, the manager of the "Kazpromtechmontazh" trust, "have simply been unable to obtain two steam-ejector pipes from Tatariya." Very little time is left. The branch ministries which are involved in the creation of the installation have to take energetic measures so that the enormous complex which is very much needed by the country is put into operation at the assigned time.

2959
CSO: 1822

## NEW OIL DEPOSIT IN THE CASPIAN

Baku VYSHKA in Russian 30 Aug 79 p 3

[Article: "New Oil Deposit in the Caspian"]

[Excerpts] An oil gusher struck offshore has signaled the discovery of a new deposit of "black gold" in the Caspian. Our Azerinform correspondent asked Doctor of Technical Sciences A. B. Suleymanov, director of Kaspmorneftegazprom [Caspian Offshore Petroleum and Gas Industry Association] to comment on this event.

"The well, which yields an abundance of high-quality crude, was drilled into structure imeni 28 April, located 15 km southeast of the famed Neftyanyye Kamni. The geologists who predicted that this area would turn out to be an offshore oil deposit were proved right.

"Drilling of the first well here began in 1977 on a specially-constructed platform. Under water 84 meters deep the shaft was sunk to a depth of 4,350 meters under sea floor. But the well turned out to be outside the oil-bearing contour and did not produce any industrially-significant signs. Nevertheless, it made it possible to pinpoint the structure of the deposit and determine the direction of the second well, which unlike the first vertical well was drilled with a slant of 1,400 meters. After development, the new well gushed pure crude.

"Another eight wells will be drilled from the same deep-water platform! For the new deposit, a platform is being prepared for installation in water 120 meters deep."

6854
CSO: 1822

## EXPERIMENTAL UNDERGROUND OIL FIELD

Baku VYSHKA in Russian 28 Aug 79 p 2

[Article by O. Nechipurenko under rubric "Increase the Yield of Oil Strata": "Shaft in Balakhany. What's delaying the construction of the experimental-industrial underground oil field"]

[Text] To the inhabitants of Balakhany the unusual drilling rig on the outskirts of town is already a familiar sight. Permanent buildings have been constructed around it: an administrative and service building, a compressor station, a laboratory building to monitor the drilling mud, and numerous electrical equipment facilities. Everything here looks unfamiliar: a bit about the size of a railroad tank car, gigantic drill pipes and, finally, the base of the future shaft--a six-meter front shaft more than two dozen meters deep.

"This is just the beginning," says V. Sapozhok, senior geologist of the scientific-research and productions operations shop of Leninneft' NGDU [Petroleum and Gas Production Administration], which will begin to operate the underground oil field after construction is completed. "Our main operation covers an area of hundreds of hectares at a depth of 300 meters."

The tunneling of the main structures of the underground oil field is being handled by the All-Union State Trust for Tunneling Mine Shafts by Special Means of the Ministry of Installation and Special Construction Work. A unique rig made by the Ural machine builders and delivered here from the Donbass will make it possible to drill two shafts 100 meters apart--a work shaft and a ventilation shaft--which will be connected by tunnels. When we reached the project, the installers were repairing the equipment.

"Unfortunately, we cannot complete the installation and begin adjusting the equipment," said Donetskshakhtspetsstroy Deputy Chief Engineer L. Podvoyko, "because construction work has not been completed and there is no electricity to the site."

In fact, the workers of Construction-Installation Administration No 3 of Azneftestroy Trust and the specialized construction-installation administration of Azneft' are letting the tunnelers down. A long list of jobs that

were supposed to be carried out according to the schedule established at the end of March by Azneft' Chief Engineer A. Lyatifov has not been completed to this day.

Although the schedule has been disrupted, the construction of the power line and substation are nearing completion. But the tunnelers do not have nay hopes of getting electricity soon. Installed in uncompleted structures, many switchboards have been ruined. And although specialists of the Baku Soyuznefteavtomatika Installation and Adjustment Administration have managed to repair some of it, there is much to do.

And there is another big hitch in the building of the oil field.

In order to avoid errors in project planning that can result in postponing the oil field, the general project planner--PechorNIPIneft' [Pechora Petroleum Scientific-Research and Planning Institute]--is imposing demands on the client which are, in our view, completely justified. On the basis of experience in the construction and operation of the underground oil fields of the Yaregskoye deposit (Komi ASSR), institute specialists are insisting that the whole complex of research and the preparation of revised data with regard to the geological structure of the ground in the area be completed before the drilling of vertical shafts is started. This requires the drilling of several control shafts that are not very deep. But the personnel of the underground and capital well repair shop of Leninneft' NGDU did not start drilling them until two years after the construction of the underground oil field was begun. And now the research is just beginning.

It is already clear, nevertheless, that the conditions of operating the Balakhany underground oil field will differ substantially from all present underground facilities of this type and will entail the development of radically new types of equipment, automation devices, and control and measurement instruments.

Thus, the high gas content in Balakhany oil will require automatic gas analyzers, meters, and signaling equipment that are much better than those now being used in world practice.

There is another factor to consider. Presently existing rigs make it possible to drill underground wells 200 meters in length, but specialists estimate that it is more rational in this case to construct wells 500 meters long.

The resolution of all these tasks, of course, will be impossible without the help of the collectives of the project planning and design organizations. They have done a certain amount of work. The Moscow Fundamentproyekt Institute, for example, soon provid d the oil workers with the necessary recommendations to follow in the event of possible freezing of the soil. The All-Union Scientific-Research Institute of Safety Engineering offers gas signaling equipment of new design. And specialists of Gipromorneftegaz

[State Project Planning Institute for Offshore Petroleum and Gas] have been a big help to the builders of the underground oil field in selecting the best kind of scrubbing equipment.

The problems involved in building the underground oil field require more attention than is being given to them by Azneft'. Many questions involved in construction, the formulation of project-estimate documentation, financing, and the selection and ordering of equipment are not being resolved fast enough.

A. Vezirov, head of Azneft's technical division, complains:

"I have been involved with this project just a few months, and with others as well, of course. But before me there were many others who were also involved just as sporadically; naturally, this could hardly fail to have an adverse effect on the pace of construction."

The first phase of the experimental-industrial underground oil field is supposed to go operational at the end of the 10th Five-Year Plan. But if things continue to go on this way, the deadline may not be met.

6854
CSO: 1822

## OIL PIPELINE CONSTRUCTION PROGRESS REPORTED

Moscow TRUD in Russian 26 Sep 79 p 1

/Article by Yu. Shukov, city of Gor'kiy: "Through Rivers, Forests and Swamps"/

/Text/ The route of the Surgut-Perm'-Gor'kiy-Polotsk oil pipeline, the first section of which went into operation recently, is coming closer and closer to its end point. The forward edge of the steadily growing oil pipeline now runs through Gor'kovskaya Oblast.

The course of the pipeline could be seen as a broad bright yellow band against the greenery of the Volga forests. From an opening in the helicopter it looks like an ordinary clearing; it rises up in banks of clay dug out from trenches, then it breaks off and disappears in the forest or it winds in a smooth line of brown steel pipes.

Along the route from Surgut to Gor'kiy 3 million $m^2$ of earth have been removed, and hundreds of kilometers of temporary log roads have been laid through swamps. The needs of the national economy dictate the extremely tight deadlines--it was decided to build the artery in two years instead of the four called for by the plan. The Perm' to Gor'kiy sector is scheduled to go into operation no later than October of this year. Overcoming forests, bogs, large and small rivers, roads and railways, the pipeline is coming to Gor'kiy.

The piplines comes up against a scattering of pipes on the edge of the city of Bogorodsk. Pipe welding base SU-4 is located here, where the brigade of M. Yakimov, holder of the Order of the Labor Red Banner, welds 33-meter sections of pipe. Mikhail Mikhaylovich stands in the center of a rotatin rack and welds the join of the next length. He has a face tanned to the color of chocolate, bright merry eyes and a firm handshake. The brigade leader has behind him 20 years of experience in oil pipelines. His personal mark--the number 23--can be seen on the butt joints of steel arteries in the Saratov steppes, in the Tyumenshchina taiga, in Belorussia and Central Asia.

One after another the 20-ton sections slide down the rack. A powerful pipe layer loads them onto vehicles, and, straining under the load, the trucks move off along the uneven log roads to the pipeline route.

The shadow of our rotary wing vehicle easily overtakes the pipe carriers and runs alongside the clearing to the east, to the SMU-6 site, which is leading construction of the pipeline from the eastern boundary of of Gor'kovskaya Oblast. This is one of the most difficult sections of the of the route. In the spring theyhad just managed to weld a few lengths of pipe when flooding began to threaten the site. The builders then used the "island alternative." They shifted equipment and people to the other end of the sector, where the soil is better and the site higher, and they began to move in the opposite direction. The maneuver yielded good results. The neighbors were forced to wait out the period of bad roads, but here the welders proceeded confidently to increase the steel link, and by the beginning of August they had come up to the Kerzhenets, a tributary of the Volga.

The pipeline already crosses through ten oblasts of Russia. The new underground artery will supply black gold from Western Siberia to oil refining enterprises in Perm', Gork'kiy, Yaroslavl', Ryazan', Moscow and cities in Belorussia. The pipeline will connect all the supply systems of plants in the European section of the country, and it will provide reliable supplies of raw materials to these industrial centers; it will significantly lessen the load on the railways.

8543
CSO: 1822

# MEETING OF SPECIALISTS REVIEWS PROGRESS IN REFORMING, HYDROFINING

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 9, Sep 79 55-56

[Article by Ye. V. Lepnina, TsNIITEneftekhim [Central Scientific Research Institute of Information and Technical-Economic Research of the Petroleum Refining and Petrochemical Industry]: "Primary Ways to Develop and Improve the Processes of Reforming and Hydrofining"]

[Text] The steadily increasing requirements for the quality of gasoline, diesel fuel, and aviation fuel along with the growing volume of sulphur-containing petroleum demand constant improvement and intensification of such secondary processes of oil refining as reforming and hydrofining. These processes play an important part in assuring a progressive production structure and skilled petroleum refining to obtain high-quality motor fuels.

At the present time various types of reforming and hydrofining units are used at all the country's refineries. A generalization of experience with the operation of reforming and hydrofining units in recent years would make it possible to intensify existing units and design new industrial systems.

In May 1979 in the city of Novokuybyshevsk the Scientific-Technical Council of the Ministry of the USSR Ministry of the Petroleum Refining and Petrochemical Industry and the All-Union Production Association Soyuznefteorgsintez [USSR Petroleum Organic Synthesis], with participation by leading specialists from the VNIINP [All-Union Scientific Research Institute of Petroleum and Gas Refining and Production of Synthetic Liquid Fuel], VNIINeftekhim [All-Union Scientific Research Institute of Petroleum Refining and the Petrochemical Industry], Lengiproneftekhim [Leningrad State Planning Institute for the Petroleum Refining and Petrochemical Industry], the Production Association "Kuybyshevnefteorgsintez" [Kuybyshev Petroleum Organic synthesis], and other production associations and refineries, as well as scientists from the institute of the Academy of Sciences Belorussian SSR and the Kuybyshev Polytechnic Institute, held an expanded meeting of the section on petroleum refining with the topic

"Work experience and further improvement in the processes and units for hydrofining of light petroleum products and catalytic reforming of gasolines."

Reports were given at the meeting. They dealt with experience in using and intensifying existing catalytic reforming units at AP-64 type catalyzers and communications on experience with units on the new KR-type catalyzers. Reports summarized experience with the work of units for hydrofining of motor fuels and results of operating these units on new zeolite-containing catalyzers of the GO-115, GO-116, and GK-35 types. Other ways to improve the processes of catalytic reforming and hydrofining were outlined and the most promising lines of development in their design were noted.

The most significant contribution to the development of catalytic reforming and increasing the efficiency of the process today has been the construction and incorporation of large-capacity installations (L-35-11/1000), including ones that are part of modern LK-6U combined systems and the introduction of new bimetallic and polymetallic KR-type catalyzers, which have high stability. The technology and equipment of catalytic reforming units have been greatly improved. With active participation by enterprises of the sector, VNIINeftekhim, VNIINP, and Lengiproneftkhim developed and introduced a number of proposals to intensify existing units. On the basis of the findings of VNIINP and VNIINeftekhim and taking account of experience operating the LK-6U system, Lengiproneftekhim is designing a large new LK-9M combined unit which includes blocks for catalytic reforming and hydrofining, which are planned for use in new catalyzers.

Industrial production of KR-102 and KR-104A catalyzers has been organized. The KR-104 catalyzer has been awarded the Mark of Quality.

In the last five years a large-scale transition has been made to KR-type catalyzers; 19 units at nine enterprises of the sector are now operating with this type of catalyzer. We should particularly note work on the introduction of polymetallic KR-type catalyzers at the Novo-Ufimskiy and Ryazan' refineries, the Production Association Gor'knefteorgsintez [Gor'kiy Petroleum Organic Synthesis], and the Production Association Kirishinefteorgsintez [Kirishi Petroleum Organic Synthesis]. Experience operating the units on KR-102 and KR-104 catalyzers confirmed the possibility that the service life of these catalyzers is at least four years and the possibility of achieving a 12-15 month cycle between regeneration when operating in a rigid regime.

Along with the advances made in the development of the process of catalytic reforming, participants in the meeting also reviewed and discussed shortcomings that are obstructing normal operation of the units and improvement of the process.

Capacities for catalytic reforming are not used efficiently enough due to frequent unplanned shutdowns for repair. Some of the units need to have obsolete and worn out equipment, in particular reactors, replaced.

The question of the quality of raw material preparation is becoming especially critical as reforming units are switched to bimetallic and polymetallic catalyzers. Inadequate removal of sulphur, mechanical impurities, and salts from the raw material, which occurs at refineries, and processing raw material of unplanned fractional composition make it difficult to switch units to polymetallic catalyzers. In addition, the operation of reforming units on KR-type catalyzers is being held up because conditions have not been worked out adequately for switching units and preparing them to work on the new type of catalyzer. There are no recommendations on protecting the equipment and piping of the units against corrosion during the activation of KR-type catalyzers.

New, more effective hydrofining catalyzers must be introduced to provide existing reforming units with raw material that contains 0.5-1 ppm of sulphur. It would be wise to set up secondary distillation of gasoline to improve the quality of the raw material by fractional composition.

When preparing catalytic reforming units for work on KR-type catalyzers, it is necessary to give attention to supplying the units with launching gas (hydrogen with a concentration of at least 90 percent, industrial nitrogen) and methods of storing and delivering the raw material to preclude coking in the heat exchangers of the furnaces and catalyzer of the preliminary hydrofining block.

At the catalysis factory of the Production Association Angarsknefteorgsintez [Angarsk Petroleum Organic Synthesis] the method of activation chlorination of catalyzers during roasting must be incorporated for successful incorporation of the production of new polymetallic catalyzers and further improvements in the quality of existing ones. The Production Association Kuybyshevnefteorgsintez and the Ryazan' Petroleum Refinery must incorporate the method of impregnating the carrier in the apparatus with concentration of the working solution. VNIINeftekhim and the Ryazan' Petroleum Refinery must continue incorporation of the KR-106 catalyzer at the LCh-35-11/600 installation. VNIINeftekhim and the Novo-Ufimskiy Refinery are to begin experimental industrial testing of the KR-108 catalyzers in 1976 [sic].

After hearing and discussing the reports by specialists of the sector concerning experiments with launching, incorporating, and operating catalytic reforming units, the expanded section on petroleum refining of the Scientific-Technical Society of the USSR Ministry of the Petroleum Refining and Petrochemical Industry recommended the following

primary directions for further improvements and development of the process of catalytic reforming of gasoline:

1. increasing the capacity of units;

2. lowering the pressure of the reforming process;

3. modernization of equipment;

4. study and dissemination of progressive methods and procedures for operating catalytic reforming units.

It was recommended that enterprises of the sector that are operating L-35-11/1000 and LCh-35-11/600 installations study and make use of the practices followed by the Novo-Ufimskiy and Salavat NKhK [possibly Petrochemical Complex] to raise the productivity of installations of this type.

When working with catalyzers of the AP and KR series, the "Basic points of launching and operating catalytic reforming units" developed by VNIIneftekhim and ratified by the All-Union Production Association Soyuznesteorgsintez in 1979, must be followed rigorously.

Analyzing the work of the hydrofining unit, participants at the meeting observed that the introduction of efficient new catalyzers of the GO and GK-35 series and ANM-R catalyzers has been a measure advanced recently. The launching of large industrial installations of a new generation, becoming part of the LK-6u system and the L-24-9 installation, is also an important stage in the development of the hydrofining process.

The GO-115 and ANM-R catalyzers have gone through industrial testing with positive results at the Production Association Yaroslavnesteorgsintez [Yaroslavl' Petroleum Organic Synthesis]; the GO-116 has been successfully tested at the Ryazan' Refinery and the GK-35 at the Syzran Refinery. Since 1978 broad introduction of the GK-35 catalyzer has begun at the Production Association Gor'knefteorgsintez, the Novopolotsk and Kuybyshev refineries, and other enterprises. Industrial production of GO-115 and GO-116 hydrofining catalyzers has been incorporated at the Ryazan' Refinery; the Production Association Kuybyshevnefteorgsintez has incorporated the production of GK-35 units and ANM-R units are being produced at the Angarsknefteorgsintez Production Association. However, there are various problems and difficulties in the production of hydrofining catalyzers. The catalyzer factories of the Production Association Omskneftorgsintez and the Production Association Kubyshevnefteorgsintez, as well as the Ryazan' Refinery, are not producing a finely cast catalyzer of good commercial appearance. The equipment for drying and roasting the catalyzer (driers, molding machines, and the like) in catalyzer production needs to be replaced.

Measures have been carried out at many existing L-24-6 and L-24-7 hydrofining units that make it possible to intensify the work of the unit by an average of 33 percent. Of particular note is the work of the collectives of the L-24-6 units at the Novokuybyshev and Novopolotsk refineries and the collective of the L-24-7 unit at the Production Association Gor'knefteorgsintez. A hot separation scheme with preliminary heating of the raw material has been introduced in the L-24-6 unit at the Ryazan' Refinery. This has permitted a significant improvement in the technical-economic indexes of the unit. However, the rate of intensification of existing diesel fuel hydrofining installations is inadequate. A number of factors are holding it back. One is unproductive loading of hydrofining units because of an increased content of light fractions (to 230 degrees C) in the raw material, which limits resources for the introduction of diesel fuel. The question of hydrofining of gasolines of secondary origin has not been solved, so gasolines from thermal cracking and coking are not used as reforming raw material. Equipment at many industrial installations, in particular pumps and compressors, needs replacement. Stabilizing columns need improvement and air coolers must be introduced. Unsatisfactory preparation of hydrofining catalyzers before launching at many enterprises affects the efficiency of the process. Hydrofining is often done at too high a temperature and at lowered volumetric velocities. Virtually no enterprises keep proper track of the use of hydrogen for hydrofining, which has a negative effect on the economic efficiency of the process.

To raise domestic hydrofining processes to the level of the best foreign companies we must develop and broadly introduce new highly active catalyzers that make it possible to reduce the temperature of the process 20-30 degrees C, cut the circulation of hydrogen-containing gas by one-third to one-half, and significantly increase the volumetric velocity of heating of raw material; develop and publish recommendations on reducing coke deposition in heat exchanger equipment, pipe furnaces, and reactors. Unified norms for use of the catalyzer must be developed for different types of raw material. With the help of VNIINT and Lenziproneftekhim the enterprises must work out the question of preparing raw material with a narrower fractional composition and develop concrete measures and a timetable for switching hydrofining units to this raw material. Special attention needs to be given to preparing catalyzers for operation. The industrial regimes for drying, sulfiding, and regeneration must be strictly observed. The procedure for regeneration of worked out catalyzers should be improved taking account of the need to protect the environment against harmful waste.

The basic direction of further advance in the process of hydrofining of distillate fractions is the conception of new consolidated units, both standing alone and as part of combined systems, modernization and intensification of existing capacities, and introduction of efficient new catalyzers.

Performance of the recommendations of the meeting by enterprises, scientific research institutes, and planning institutes will promote an increase in the production of high-quality gasolines, diesel fuels, and aviation fuels.



11,176
CSO: 1822

UDC 665.63.013
665.622.43.065.5.013
665.63.048.37-982.004.69
665.637.6.002.33

# USE OF VACUUM UNITS TO PRODUCE MEDIUM-VISCOSITY DISTILLATES

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 9, Sep 79 pp 25-27

[Article by M. L. Kreymer, L. B. Khudaydatova, I. D. Nesterov, Ye. K. Rudakova, and R. G. Kutluyeva, Bashkir ASSR Scientific Research Institute of Petroleum Refining: "Modernization of the Vacuum Unit of a High-Productivity ELOU-AVT To Obtain Raw Material for Oil Production"]

[Text] One of the best ways to intensify the processes of oil production and improve the quality of oil products is to narrow the fractional composition of distillate fractions and residue.

A study was made of the possibility of obtaining 60-70 degree oil fractions in a high-productivity ELOU-AVT [possibly electric desalinization unit-AVT] installation for primary petroleum distillation whose vacuum part has been designed to obtain raw material for catalytic cracking in the form of two fractions with tentative boiling ranges of 350-420 and 420-500 degrees C [1].

According to the design the K-10 vacuum column has 23 direct-flow valve and perforated rectification plates, four in the distillation part. The diesel fuel fraction, the gas oil fractions at 350-420 and 420-500 degrees C, and the darkened product are removed from the column by side-cut distillates, while the residue is taken from the bottom of the column. Mazut oil is heated in the coil of the furnace by parallel flows in pipes with diamters of 150 (in the heating zone) and 150-200 (in the evaporation zone) D.u. [expansion unknown].

The conditions for fractioning mazut oil to obtain raw material for oil production were selected by mathematical modelling with a Minsk-22 computer [2]. During the calculations the problem was posed of selecting conditions for separation of the mazut with slight changes in the design layout of the installation but insuring maximum separation of medium-viscosity distillate with heightened requirements for its quality and the quality of the residue. The initial raw material adopted in the calculations was mazut in a 3:1 mixture of Baku Sangachaly Sea and Karachukhur petroleums (see Figure 1 below).

The primary physical and chemical constants of the products of separating the calculated fraction were determined experimentally.

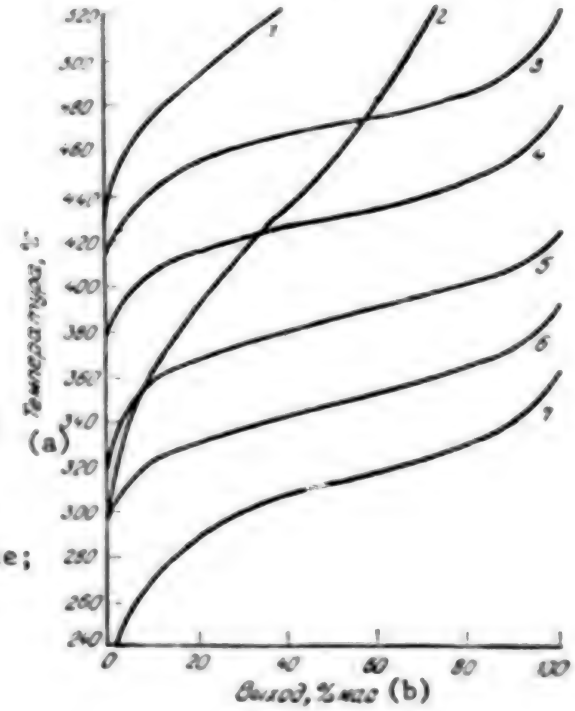



Figure 1. Fraction Composition (True Boiling Point) of Mazut and Products of Separations

Key: (a) Temperature, °C;
(b) Output, percent by weight;
(1) Sediment;
(2) Mazut;
(3) Viscous distillate;
(4) Medium-viscosity distillate;
(5) Low-viscosity distillate;
(6) Transformer distillate;
(7) Diesel fuel fractions.

---

The calculations demonstrated the possibility of obtaining 60-70 degree fractions and a residue of narrow fractional composition by separating the mazut using a double column layout (see Figure 2 below).

After heating in furnace P-3 the mazut enters vacuum column K-12 for separation. Column K-12 has 19 theoretical plates, 15 in the rectifying section and four in the distilling section. Diesel fuel vapors are removed from the top of column K-12 and condensed in a watertight surface condenser.

The transformer and low-viscosity distillates and the first fraction of the medium-viscosity distillate are removed from the unit by side-cuts through strippers. The semiresidue from the bottom of column K-12 goes through furnace P-4 and reaches the second vacuum column K-10 (plates 1-3 are practical plates and the rest are theoretical). The second fraction of the medium-viscosity distillate and the viscous distillate are removed from the rectifying section of column K-10 as side-cuts through strippers. The residue is removed from the bottom of the column. The mazut and semiresidue are separated in the vacuum columns with a moderate vacuum in the presence of water vapor (see table).

Superheated water vapor is fed to the bottom of the rectifying and stripper columns; live steam is fed to the coils of the furnace for heating the mazut and semiresidue.

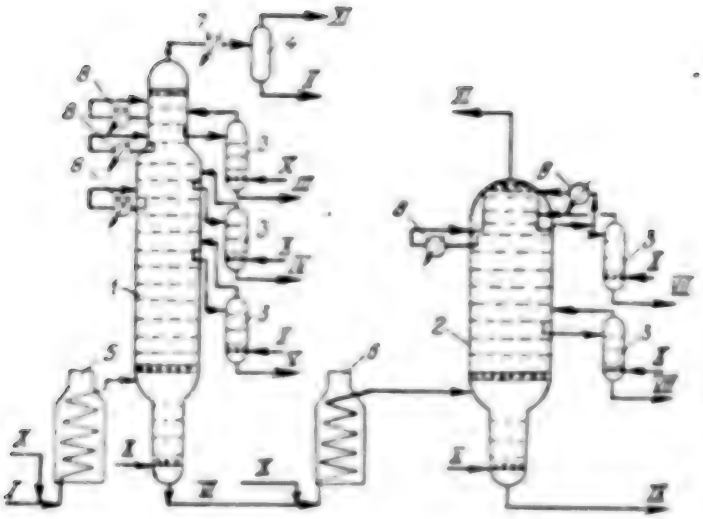


Figure 2. Diagram of Unit for Vacuum Distillation of Mazut Oil

Key: (1) K-12 vacuum column;
(2) K-10 vacuum column;
(3) Stripping columns;
(4) Gas separator;
(5) P-3 vacuum furnace;
(6) P-4 vacuum furnace;
(7) Condenser;
(8) Heat exchangers;
(9) Heat exchangers and cooling unit;

(9) Flows:
(I) Mazut;
(II) Diesel fuel fraction;
(III) Transformer distillate;
(IV) Low-viscosity distillate;
(V, VII) Distillates I and II of medium-viscosity distillate;
(VI) Semiresidue;
(VIII) Viscous distillate;
(IX) Residue;
(X) Water vapor;
(XI) Decomposition gases.

---

The mazut separation conditions selected insure receipt of 60-70 degree distillate fractions and a residue of the quality required for the production of transformer, industrial, and motor oils.

The transformer distillate has a kinematic viscosity of 7.0 centistokes at 50 degrees C and a flash point of 160 degrees C. Its five percent boiling point, according to Bogdanov, is 320 degrees C, and the 95 percent point is 377 degrees C. The low-viscosity distillate

Technological Parameters of Mazut Distillation

| Indexes | Vacuum Column | |
|---|---|---|
| | K-12 | K-10 |
| Temperature, °C: | | |
| Raw Material Entering Column | 370 | 400 |
| Top of Column | 149 | 150 |
| Bottom of Column | 319 | 354 |
| Pressure, mm merc col: | | |
| Top of Column | 48 | 45 |
| Feeding Zone | 138 | 108 |
| Bottom of Column | 162 | 126 |
| Water Vapor Used, % weight against mazut: | 3.0 | 1.88 |
| Included in above | | |
| In Furnace Coil | 0.3 | 0.22 |
| In Bottom of Column | 2.0 | 1.46 |
| In Strippers | 0.7 | 0.20 |

has a kinematic viscosity of 14.37 centistokes at 50 degrees C (4.02 centistokes at 100 degrees C) and a flash point of 200 degrees C. The medium-viscosity distillate has a viscosity of 7.0 at 100 degrees C and a flash point of more than 225 degrees C. In its composition, according to Boganov, the content of fractions that boil at higher than 400 degrees is five percent and 95 percent boil before 460 degrees C. The total recovery of medium-viscosity distillate (fractions I and II) is 92 percent of the potential. It is impossible in practice to increase the precision of separation, in order to recover more medium-viscosity distillate, by increasing the number of rectifying plates in column K-10. The great resistance of the rectification plates causes an increase in pressure in the raw material feeding zone and a decrease in the proportion of raw material recovered and the reflux ratios of these plates. As a result, the impact of increasing the number of plates is lost.

The viscous distillate removed to regulate the quality of the reside (about one percent of the petroleum) has a kinematic viscosity of 12 centistokes at 100 degrees C and a flash point of 250 degrees C. The residue contains 7.0 percent fractions that boil before 470 degrees C; its softening temperature by Kish [expansion unknown] is 42 degrees C.

Based on the results of calculations for the furnace coil the heat capacity of the P-3 and P-4 furnaces is 25-26.6 megacalories per hour.

The P-3 furnace keeps the planned number of flows and pipes to heat the mazut. In the P-4 furnace the semiresidue is heated by four flows in 19 pipes with diameters of 150 and two pipes with diameters of 200 D.u. for each flow.

Thus, to insure maximum production of medium-viscosity distillates and receive 60-70 degree distillate fractions and residue, we recommend the two-column scheme of separating mazut with a connection among vacuum columns based on residue.

FOOTNOTES

1. Gustov, V. K., et al, NEFTEPERERABOTKA I NEFTEKHIMIYA 1978, No 5.

2. Galiaskarov, F. M., et al, "Peregonka i Rektifikatsiya Sernistykh Neftey i Nefteproduktov" [Distillation and Rectification of Sulphur-Containing Oils and Oil Products], Trudy BashNII NP, 1975.



11,176
CSO: 1822

UDC 665.642.4;665.77.43

# SAKHALIN PETROLEUM RESIDUE IS PROMISING RAW MATERIAL FOR ELECTRODE COKE

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 9, Sep 79 pp 9-10

[Article by A. I. Stekhun, Bashkir ASSR Scientific Research Institute of Petroleum Refining: "Residue from Sakhalin Petroleums — Promising Raw Material for the Production of Electrode Coke"]

[Text] Providing petroleum electrode coke for the metallurgical industry is a crucial national economic challenge.

A study was made of the possibility of expanding raw material resources for coking and increasing the production of electrode coke by delayed coking of residue from low-sulphur Sakhalin petroleums. A representative sample of a commercial mixture of mazut oil from Sakhalin petroleums, taken from an industrial unit at the Komsomol'sk Refinery, was investigated. The mazut had low cokability (5.5 percent) and light fractional composition (50 percent of the fractions boil at less than 450 degrees C) and were unsuitable for direct use in the coking process. Samples of residues that boil at higher than 450, 470, and 500 degrees C were obtained at a pilot mazut vacuum distilling unit. At the same time a distillate cracking residue was obtained from the pilot thermocracking unit by cracking a balanced mixture of vacuum gas oil from Sakhalin petroleums and heavy gas oil from coking residue of the same petroleum.

Table 1 below gives the characteristics of the samples of coking raw material obtained with heightened cokability.

The figures given in Table 1 show that the residues of Sakhalin petroleums have good cokability, low sulphur and ash content (in the residue that boils away at 500 degrees C the sulphur and ash figures are no more than 0.71 and 0.042 percent). The petroleums have a heightened content of heavy aromatic hydrocarbons and resin-asphalt substances, which are the primary source of coke formation. The residue that boils away at 500 degrees C, for example, has a resin and asphalt content added to the heavy aromatic hydrocarbon that reaches 72.6 percent.

Table 1. Description of Coking Raw Material

| Показатели (Indexes) | Гудроны, выкипающие выше, °С (a) | | | Дистиллятный крекинг-остаток > 350°С (b) |
|---|---|---|---|---|
| | 450 | 470 | 500 | |
| (c) Плотность при 20°С, г/см³ | 0,970 | 0,979 | 0,988 | 1,029 |
| (d) Коксуемость, % | 10,6 | 10,9 | 14,0 | 11,4 |
| (e) Содержание серы, % | 0,53 | 0,57 | 0,71 | 0,54 |
| (f) Зольность, % | 0,036 | 0,040 | 0,042 | 0,067 |
| (g) Фракционный состав (по Богданову), °С: | | | | |
| (h) н. к. | 279 | 454 | 460 | 280 |
| (i) 5% выкипает при | 446 | 467 | 480 | 340 |
| 10% » » | 454 | 470 | 490 | 360 |
| 20% » » | 474 | 490 | 509 | 397 |
| 30% » » | 488 | 500 | 528 | 372 |
| 40% » » | 501 | 514 | 540 | 390 |
| 50% » » | 515 | 525 | 550 | 400 |
| (j) Групповой углеводородный состав, %*: | | | | |
| (k) парафино-нафтеновые | 24,7 | 44,3 | 14,2 | 18,3 |
| (l) ароматические: | | | | |
| (m) легкие | 9,8 | 8,7 | 7,2 | 4,4 |
| (n) средние | 5,0 | 5,7 | 6,0 | 8,5 |
| (o) тяжелые | 24,5 | 27,4 | 27,6 | 42,4 |
| (p) смолы | 33,2 | 40,7 | 41,0 | 21,8 |
| (q) асфальтены | 2,8 | 3,2 | 4,0 | 7,6 |
| (r) Доля тяжелых ароматических углеводородов + смолистоасфальтовых веществ в общем балансе углеводородного состава сырья, % | 60,5 | 71,3 | 72,6 | 71,8 |

Key:
(a) Residues that boil at higher than,
(b) Distillate cracking residues > 350°C;
(c) Density at 20°C, g/cm³;
(d) Cokability, %;
(e) Sulphur content, %;
(f) Ash content, %;
(g) Fraction composition (according to Bogdanov), °C;
(h) Start of boiling (initial boiling point);
(i) 5% boils away at, °C;
(j) Group hydrocarbon composition, %*;
(k) Paraffin-naphthene;
(l) Aromatic;
(m) Light;
(n) Medium;
(o) Heavy;
(p) Resins;
(r) % of heavy aromatic hydrocarbons + resin-asphalt substances in total hydrocarbon composition of raw material.

* Kolbin, M. A., et al, "Chemistry and the Technology of Fuels and Lubricants," 1978, No 2, p 52.

---

The distillate cracking residue obtained at the pilot unit (see Table 1) has fairly high cokability (11.4 percent), low sulphur content (0.54 percent), and heightened aromaticity. Its total content of heavy aromatic hydrocarbons and resin-asphalt substances reached 71.8 percent (42.4 + 29.4), which gives greater coke production when such distillate cracking residue is coked.

These samples of residues and distillate cracking residue were coked in a periodic laboratory unit. The laboratory unit is operated in a work regime that simulates industrial delayed coking units that produce coke and other coking products.

---

** Medvedeva, M. I., Candidate's Dissertation, Moscow Institute of the Petrochemical and Gas Industry imeni Academician I. M. Gubkin, 1965.

It follows from Table 2 below that coking residues of a commercial mixture of Sakhalin petroleum produces a large total amount of low-sulphur coke. Where residue samples were coked at temperatures of greater than 450, 470, and 500 degrees the coke output was, respectively, 22.8, 23.3, and 28.9 percent of the raw material.

Table 2. Material Balance of Coking and Coke Quality

| Показатели (Indexes) | (a) Гудроны, выкипающие выше, °С | | | Дистиллятный крекинг-остаток >350°С (b) |
|---|---|---|---|---|
| | 450 | 470 | 500 | |
| (c) Материальный баланс коксования | | | | |
| Взято сырья, % (d) | 100,0 | 100,0 | 100,0 | 100,0 |
| Получено % мас на сырье: (e) | | | | |
| газ по $C_4$ вкл. | 14,4 | 12,2 | 9,5 | 6,2 |
| $C_5$–180°С | 8,9 | 7,0 | 7,5 | 2,7 |
| 180–350°С | 36,6 | 31,4 | 28,7 | 12,2 |
| >350°С | 17,5 | 24,3 | 24,6 | 52,0 |
| кокс (f) | 22,8 | 23,3 | 27,9 | 25,1 |
| потери (g) | 1,8 | 1,8 | 1,8 | 1,8 |
| Содержание, %: (h) | | | | |
| серы (i) | 0,56 | 0,64 | 0,78 | 0,61 |
| ванадия (j) | $3,3 \cdot 10^{-3}$ | $3,5 \cdot 10^{-3}$ | $3,7 \cdot 10^{-3}$ | $4 \cdot 10^{-4}$ |
| Зольность, % (k) | 0,13 | 0,13 | 0,20 | 0,12 |
| Истинная плотность после прокаливания при 1300°С в течение 5 ч, г/см³ (l) | 2,09 | 2,09 | 2,12 | 2,12 |

Key: (a) Residues that boil away at, °C;
(b) Distillate cracking residues > 350°C;
(c) Material balance of coking;
(d) Raw material;
(e) Received by percentage weight of raw material;
(f) Coke;
(g) Losses;
(h) Content, %;
(i) Sulphur;
(j) Vanadium;
(k) Ash content;
(l) True density after roasting at 1,300°C for five hours, g/cm³.

The coke samples obtained in this way satisfy the primary quality indexes for first-grade KZ-25 coke based on GOST [State All-Union Standard] 15833-70, with significantly better quality for sulphur and ash content and true density. The vanadium content in the coke samples does not exceed 0.0037 percent, which is one-fourth of the maximum permissible norms of long-range GOST 22898-77 for grade KZ-8 coke.

When distillate cracking residue is coked the total output of low-sulphur coke reaches 25 percent of the raw material. The coke obtained in this case satisfies the primary quality indexes of the norms of GOST 3278-62 for grade KNKE petroleum cracking electrode coke.

Thus, tests showed that the residue of a commercial mixture of Sakhalin petroleums is a valuable raw material for the production of electrode coke. Capacities for delayed coking can be established at the Komsomol'sk Refinery to make it possible to utilize available resources of low-sulphur Sakhalin petroleum to increase the production of scarce electrode coke.



11,176
CSO: 1822

# POLTAVA OIL AND GAS OPERATIONS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Aug 79 p 2

[Article by P. Loza, instructor, Industrial-Transporation Department, Poltava Oblast Committee, Ukrainian Communist Party: "Deep Horizon Reserves"]

The Decree of the CPSU Central Committee and the USSR Council of Ministers "On providing the national economy and population with fuel, electrical, and thermal energy for the fall-winter period of 1979-80"levies the task for futher expansion of fuel-energy resources. The primary growth of oil and gas in the country is presently provided by Western Siberia and the European North. However, this does not mean that other, lesser known oil regions including the Poltava area, have exhausted their capabilities. Quite the contrary, there are still considerable reserves here for increasing the extraction of fuel.

[Text] Almost thirty years have passed since the first industrial oil gusher in Poltava Oblast came in at the Radchenkovskoye deposit. But now there are annual announcements of the discovery of new gas and oil deposits here. They now number 35 within the territory of the oblast.

Primary attention recently has been focused upon exploring deep-lying formations. As a result, major gas deposits have been discovered at depths of 5 kilometers and lower. Additionally, a rather high economic efficiency of geological exploratory operations has been attained. Exploratory results for the number of productive wells in the Poltava area (Poltavshchina) exceed all-union indicator . Costs of producing a unit of reserves is one-half that of the Ukraine as a whole.

True, with increased depth, the amount of oil in the source resources decreases. On the other hand, the proportion of natural gas and condensate increases--products no less valuable. Suffice it to say that during the past decade, extraction of gas in the oblast has increased by a factor of 10.

The following considerably important condition must be noted. Oil-gas deposits of the Poltava region for the most part are situated such that their assimilation in a rapid fashion is convenient. Distances to main gas and condensate pipelines do not exceed over a dozen kilometers. Hydrocarbon raw resources are grouped near major populated areas. Discoveries in recent years of a number of perspective gas deposits place on the agenda the problem of creating three additional gas-extraction regions. How can the new subterranean storage facilities be brought into service for the country?

Poltava natural resource prospectors have amassed rich experience in the drilling of super-deep wells. However, further increases in the speed of drilling are retarded due to deficiencies in the technical equipping of brigades (teams).

Specifically, thin-walled, highly-durable drilling tools are needed for super-deep wells. However, industry does not provide enough of them. Considerable difficulties are experienced by the Poltava prospectors in conjunction with widespread distribution of anomalous high stata pressure zones at great depths. Here, reliable well head equipment is essential, as are modern strata testing apparatus.

The Ukraine developed and originated in a timely manner the practice of accelerated operational drilling, which results in substantial reductions in the time periods required to prepare deposits for industrial development.

However, to the present time, no complex of mandatory research operations has been established for operational wells partially fulfilling exploratory functions, whic at times negates the utility of initial operations. It is time, in our view, for Union ministries of geology and the gas and oil industries to legalize a new methodology for the assimilation of deposits.

As opposed to natural gas, the extraction of oil in the Poltava region is decreasing every year. This is generally explained by the development of reserves. With regard to active fields, such an explanation, it must be admitted, is justified. At the same time, the opportunities for locating new subterranean liquid fuel storage facilities are far from being exhausted. An example is the discovery of the Rudenkovskoye deposit.

Thus, overall one must address not so much the problem of depletion of reserves as a problem of inadequate exploration or prospecting methods. Specialists of the "Poltavneftegazrazwedka" trust have set a course now toward preparation chiefly of gas reserves. Obviously, there is an idea to more rationally distribute efforts of the prospectors, and to allocate sufficient attention also to the exploration of new oil formations.

Considerable reserves exist also in the "old" oil areas. In three years of the five-year plan, the collective of the "Poltavaneftegas" oil-gas extracting administration, through optimization of well operating modes and the introduction of programs to intensify extraction, achieved additional production of 92,000 tons of oil. Almost as much as received through the introduction of new wells into service!

However, the successes of the oil workers here could be even more considerable if there were no shortage of high-production equipment. For example, rod pumps produced by the Baku Plant imeni Dzerzhinskiy are used for exploiting deep wells. The warranted service life for uninterrupted operation is 50 days. What is more they often arrive at the fields with factory defects. The operations workers were even forced to design special stands for check-out of the pumps and for their repair. Poltava oil-workers annually repair approximately 300 deep operation pumps, which require the expenditure of considerable labor and material resources.

Timely and high-quality major overhaul of the wells takes on particular significance at the old fields. During the current five-year plan, the Poltava area obtained an additional 400,000 tons of oil through this procedure. Here, however, the equipment causes problems often. The lack of a mobile unit with 50-100 ton lifting capacity considerably affects the quality and efficiency of repair operations. The fifty-ton "A-50" unit which the oil workers are equipped with is not suitable for deep well operations, inasmuch as the weight of the pump-compressor pipe column frequently exceeds its lifting capacity.

From what has been stated, the following conclusion is possible: Poltava oil workers want and can increase their contribution to the expansion of the country's fuel-energy potential. The most expeditious solution of the problems cited here will aid them in successfully coping with this task.

1851
CSO: 1822

## BELORUSSIAN OIL AND GAS INDUSTRY

Minsk SOVETSKAYA BELORUSSIYA in Russian 2 Sep 79 p 2

[Article by L. V. Pavlyushchik, chairman of the republic committee of the trade union of oil and gas industry workers: "From Our Underground Storehouses — Today is Oil and Gas Industry Worker Day"]

[Excerpts] The extraction of petroleum and gas in our country is growing every year. These minerals provide outstanding fuel and the most valuable raw material for the chemical industry. The efficiency of public production today depends significantly on the work of oil and gas workers. At the request of our SOVETSKAYA BELORUSSIYA correspondent, L. V. Pavlyushchik, chairman of the republic committee of the trade union of oil and gas industry workers, discusses in the article below how the republic oil and gas industry is developing and what progress is being made in these sectors on fulfillment of the assignments of the 10th Five-Year Plan.

The first gusher of Belorussian oil was struck 15 years ago not far from Rechitsa. This marked the beginning of a new economic sector for the republic. Belorussia today operates about 130 industrial wells. A large production association, Belarus'nft', extracts about 3 million tons of petroleum a year. The extraction of "black gold" in the republic is a difficult matter. The oil generally occurs at great depth and is concentrated in singular underground traps spread over large areas. Such conditions require great effort for the construction of new roads and pipelines. This makes it even more pleasant to report that republic oil workers are maintaining a high, vigorous work tempo, opening up new reserves, and putting them at the service of productive industry. In the first eight months of this year they have to their credit 5,600 tons of petroleum beyond the plan, more than 13 million cubic meters of by-product gas, and more than 9,000 meters of additional rock drilled.

Belorussian oil workers are doing well on a state assignment of great honor, building oil wells in Western Siberia, which is the country's principal oil and gas region. Once every two weeks an airplane makes a special trip to carry drilling workers, derrick installers, and geologists for a tour of duty in the Tyumen' region. Since the first of the year they have drilled through 70,000 meters of rock, more than 12,000 meters beyond the plan.

The search for new oil reserves is not halted in our republic either. Specialists from the Belneftegeofizika [Belorussian Petroleum Geophysics] Trust are working in this area. Using the latest equipment, they are conducting successful seismic explorations to prepare structures for drilling oil wells. Their work determines whether the drillers will strike oil or not. We must say, that the accuracy of the geophysicists is improving. This collective deservedly holds a prize-winning position in all-Union socialist competition.

In recent years geophysicists have made increasing use of highly efficient instruments and devices developed and built by engineers at the Gomel' design bureau for seismic equipment. The technique of geological exploration proposed by them replaces the blast, which carries some danger and is not always controlled, with a strong pulse, a vibration from a surface source. The Gomel' devices are being used effectively searching for oil and gas in Western Siberia, the Bashkir ASSR, and Georgia.

The republic's gas sector has become an important socioeconomic factor that influences economic development today. It has continued to grow in the current five-year plan. Gas now accounts for 18 percent of fuel in the republic. It is used by 675 industrial enterprises and 887 municipal and domestic enterprises.

In the 10th Five-Year Plan natural gas has been brought to the cities of Zhodino, Orsha, and Borisov. A 63-kilometer line to Vitebsk will be laid this year, and construction will begin later on a 94-kilometer branch line to Mogilev. Technical-economic substantiation has been worked out for gas lines from Minsk to Gomel' and Vil'nyus. Natural gas was supplied to the apartments of inhabitants of Stolbtsov, Dzerzhinsk, and Mostov ahead of schedule, and dried by-product gas is delivered to Rechitsa. Svetlogorsk will soon be connected to gas lines.

More than 2,130,000 apartments in Belorussia today have gas. This means that gas is used in the kitchens in virtually all housing in cities and urban-type communities and in 75 percent of the rural homes.

Construction workers are making a worthy contribution in supplying gas to new areas and increasing petroleum extraction. In the current five-year plan the collective of Trust No 2 of Soyuzgazpromstroy [All-Union Association of the USSR Ministry of Construction of Petroleum and Gas Industry Enterprises] has incorporated 60 million

rubles of capital investment. Important oil and gas industry facilities have been launched such as the gas refinery in Rechitsa, the Osipovichi station for underground gas storage, and compressor plants in Minsk, Orsha, Kobrin, and Nesvizh; 22,000 square meters of housing has been built.

Oil and gas industry workers are laboring hard to meet the challenges outlined by the 25th CPSU Congress. They are steadily broadening socialist competition to perform the assignments of the 10th Five-Year Plan ahead of schedule. Many leading workers and collectives are aiming to fulfill their five-year plan assignments by the 110th anniversary of the birth of V. I. Lenin.

To all of them and their comrades we say today: "Congratulations on this holiday to the people who give us heat and light."

11,176
CSO: 1822

# DEEP DRILLING IN AZERBAIJAN

Baku VYSHKA in Russian 15 Sep 79 p 2

/Article by A. Ddurmish'yan, Director, VNIPIgaz Laboratory, Azerbaijan SSR Meritorius Engineer, Doctor of Geological-Mineralogical Sciences, Professor: "Do Not Forget The Most Important Thing"/

/Text/ Our country has achieved great successes in the theory and practice of prospecting, surveying, and development of oil, gas, and gas condensate deposits. Those successes facilitate successful realization of the basic principles of assimilating our oil and gas reserves and protect our mineral resources, and entail carrying out an entire complex of operations with minimum capital investments during optimum time frames for the national economy, and provide for maximum possible extraction coefficients for mineral reserves.

Against the background of these achievements, it is particularly sad to witness shortcomings which to a certain degree undermine scientific bases for assimilating gas and oil resources and which noticeably lower the effectiveness of operations to extract those reserves. Therefore, it seems that "Vyshka" acted absolutely correct in publishing in its pages the extend discussion of problems in improving the effectiveness of geological investigations of our mineral resources.

In our country's oil-extraction industry, a system has been established since its inception under which the study of mineral resources, the investigation of oil reserves and deposits and gas also, and the prepartion of required geological-geophysical data was done by geologists. Our history in this sector has witnessed periods of particular fruitful and effective geological service operations, and there have also been times of less successful operations.

While still a student, I heard the graphic words of Sergo

Ordzhonikidze: spoken during the Thirties: "A geologist can ravage and enrich". In later years, working in the oil fields, I was convinced of the correctness of those words many times. Yes, a geologist actually can both enrich and ravage. This refers not only to drilling and planning the wells, but to all other stages of assimilating and development of detected deposits.

Productivity of a geologist's work is possible, of course, with his high professional qualifications, his comprehensive knowledge of mineral resource characteristics, which in turn insure making correct, scientifically founded decisions. But, in addition, the geologist must possess the requisite rights without which the best of his intentions may go unrealized. These rights are required to accomplish operations which are frequently complex, and in a number of situations, dangerous to the "life" of the wells, and even at times, it would appear, to be inimical to the interest of fulfilling drilling and extraction plans for oil and gas.

True, geologists have such rights formally. However, in actuality, during daily operations, as the result of the complexities cited above, situations arise which acutely restrict the geologists' latitude to use those rights.

Now in Azerbaijan, particularly in the water areas of the Southern Caspian, there exist deposits which require the drilling of a considerable number of wells to a depth of 6,000 meters and more. These include the Bulla-Sea area, the Andreyev Bank, Shakhovo Sea, Bakhar, and others. The drilling of super-deep wells at the indicated and other wells in neighboring areas is accomplished under extremely adverse geological conditions. We cite for example, the taking of a core sample from great depths under those conditions--a matter not only complex, but extremely dangerous as well.

Recently, I witnessed a rather sharp argument regarding the taking of a core sample in one of the wells being drilled in the Bulla-Sea area. In this well, at a depth of almost 6,000 meters, a seventh oil horizon of the productive stratum was discovered, a test of which promised a powerful gusher of gas and condensate. The geologists however, needed a rock sample from this well. The argument ensued: to take the sample or not. The fact was, no one could guarantee an accident-free operation to take a core sample from this well. Jumping ahead, I will state, that in this instance the matter turned out well; the sample was obtained, afterwhich the well was transferred to operational status.

But imagine the state of the geologist who issued the order to take the core sample under such conditions. For several core samples from an extremely important well which has already been drilled, an accident might occur through the "fault" of the geologist. What then is to be done in such situations concerning

the taking of core samples? It seems, that in each specific situation the most rational and intelligent decisions must be found. However, the solution of this problem overall demands a totally new approach. Here, for example, is the practical recommendation of docent A. Kerimov and others participating in the discussion relating to the necessity in complex super-deep deposits for core bit obtained samples in exploratory and prospecting wells to be limited to the most necessary intervals. However, in addition to the sample, it is necessary to sink two or three evaluation-exploratory wells for broad core sampling. It would be even better if those wells were drilled using State budget funds so as to provide the latitude to totally direct their missions toward the study of the area prospected.

Another, no less important and effective means is the improvement of field-geophysical research. New and more complex exploration conditions for oil and gas deposits are levying extremely serious tasks upon the field geophysicists. Unfortunately, with rare exception, they are still in the background in this area. What is more, field geophysics have the capability for more broad interpretation of deposit logs, and for establishing more reliable geological-geophysical parameters for productive horizons.

Operations to study and assimilate deposits are also complicated by inadequacies of existing drilling equipment. Drilling equipment currently being used in the republic was designed for drilling wells to a depth of 5,000 meters. True, this equipment has been used to drill wells to a depth of 6,000 meters, but this is done with a certain degree of risk. In general, it must be emphasized that we now have an obvious disparity between deep drilling equipment and solving the tasks now facing our geologists. The oil industry now lacks stratification-testing apparatus for extreme depths, deep manometers, geophysical equipment, and other instruments. This situation may seriously affect our oil and gas extraction efforts.

One of the most acute problems generated by the conflict between the rights of geologists and conditions for utilizing those rights in providing for the drilling of exploratory wells to projected horizons. According to data of the All-Union Production Association "Kaspmorneftegazprom", of every ten super-deep wells drilled at sea, only three-four reach the projected horizon. What are the reasons? The first reason is the technological inadequacies of the drilling equipment, and the second is the premature cessation of drilling operations at the well, necessitated by requirements to fulfill current plans for oil extraction.

It is particularly lamentable, when the exploratory well, having been assigned the task of locating a new productive horizon, is stopped and then employed to extract oil or gas from an upper

horizon which has already been explored. It is quite obvious that exploratory wells in such cases lose their significance and are converted to operational wells. This often retards the opening for several years of new, deeper formations, freqently of multi-strata deposit productive horizons.

Regarding the geologists, in such instances they strive, as a rule, to drive such wells to the projected horizon, although they hardly succeed in doing so every time. Their situation is complicated in that by insisting that drilling be continued on the well, the geologists would be obviating an opportunity to assist the oil workers in fulfilling the state plan for extraction of oil and gas.

In practice, there is a number of other instances where it would appear that the interests of researching and studying the deposits collide with the interests of plan fulfillment for drilling and extracting oil and gas. The single correct solution is proceeding upon the principles formulated in our country relating to the rational assimilation of mineral deposits and protection of our nation's natural resources. Deviations in one direction or another, the resolution of one task to the detriment of another will result in negative consequences.

In this respect, it is important to correctly take into account tasks in the research and study of deposits in the formulation of state plans for drilling of wells and extraction operations, to establish close organic ties between fulfillment of plans and for provision of high recovery coefficients for reserves of oil and gas. It is our deep conviction that this indicator is the basic factor determining not only the rationality of industrial assimilation of the deposits, but also the level of working conditions with concomitant high levels of production.

Numerous instances can be sited where the intensive exploitation of a deposit--an extremely effective approach from the standpoint of obtaining high production levels for oil and gas and the fulfilling of operational extraction plans--was implemented under conditions where research and study tasks relating to the nature of formations and the principles of rational development of deposits were ignored. The results of such a practice were always deplorable: after initial high yields for the wells, there followed periods in which the yield and the operation efficiency of the well dropped. Additionally, operations lagged significantly in the study of deposits parameters, calculating oil and gas reserves, and compiling development plans. In such situations, projecting greater or lesser high levels of extraction of gas and oil is not necessary. Particularly alarming was the situation regarding oil extraction from oil margins in the deposits. At present, only an insignificant amount of oil is being extracted, and the remainder we lose irrevocably.

The Decree of the CPSU Central Committee and the USSR Council of Ministers "Improvement of planning and intensification of the management mechanism's effect in improving production efficiency and quality of operations" focuses our efforts toward achieving high end results. It is not enough to drill the well and obtain gas or oil. It is important also to provide for an appropriate level of research for drilling and operating wells, to implement an entire complex of programs which will provide the capability to develop our natural resources.

CPSU
CSO: 1822

## NATURAL GAS DESCRIBED AS POTENTIAL RAW MATERIAL

Baku BAKINSKIY RABOCHIY in Russian 7 Sep 79 p 2

[Article by P. Kiyumov, candidate of technical sciences: "Blue Fuel or Raw Material?"]

> [Text] Natural gas has been called the "blue fuel" for a long time. And for good reason--it is used mainly as a fuel for household and industrial purposes. But there is a possibility that gasoline and kerosene, which are now obtained from oil, can be derived from gas. This is the subject of this article, which we offer our readers. It may be controversial. The editorial board of BAKINSKIY RABOCHIY hope that it will, in any case, arouse the interest of specialists.

Azerbaijan has great reserves of natural gas. According to geological forecasts, it is expected that there will be even greater growth in the future than there is at present in the amount of natural gas being extracted. And at that time the question will arise in full force: how can we obtain from natural gas such products as gasoline, kerosene, diesel fuel and lubricating oils, without which the national economy and individuals cannot manage.

Can motor fuels and oils be obtained from natural gas? Yes, say chemical scientists. But they warn that the technology of the processes for obtaining "gas products" will differ significantly from the usual, well-studied technology for the production of oil products. And the possible re-orientation of motor fuel production from oil to gas raw materials will require that a large number of research projects be carried out. And, it seems, preparations for this work should be made in advance. Even now work should be under way on a detailed study of the possibility of obtaining oil refining products from gas and on the planning and construction of gas processing plants. In any case, the scientists and other personnel of the planning organs should consider that the "blue fuel" may and should become a raw material for the obtaining of motor fuels. Planning for the future will make it possible to

avoid rushed, last-minute work to build enterprises to process gas products; it may also prevent major state resources from being lost, and it may prevent dislocations in the national economy.

Our natural oil resources are limited, and there is no doubt that they must be used very carefully. And in addition to the usual measures for increasing the output for every ton of oil used and the construction of units for secondary processing, gas must play a special role. At present a total of half a ton of motor fuel and oils are obtained from a ton of petroleum, and the remaining portion is used as boiler fuel. In the not-too-distant future about four-fifths of the petroleum will be used to derive fuel for transport and to derive products of petrochemical synthesis. Nonetheless, the problem cannot be solved unless the "blue fuel" comes to the aid of petroleum. And this supplementary source of refined petroleum products may, it seems, become with time the main source.

The natural gas of Azerbaijan consists largely of methane and relatively small quantities of other hydrocarbons. The latter are separated out at existing gas-refining plants, and the remaining methane is then used as gas fuel. The removed substances serve as raw materials for petrochemical synthesis and a certain portion of them is used in the form of liquid fuel gas, mainly for household needs. Thus, natural gas is currently used almost entirely as fuel, and only a small portion of it is used effectively.

How can the "blue fuel" be turned into a raw material for the production of motor fuels? Through chemistry, naturally, which will make it possible to convert methane, which today is only suitable for combustion, into hydrocarbons, which are part of, let us say, gasoline or lubricating oils. There are several specific ways in which this can be done. The first is by turning methane into carbon monoxide and hydrogen, then obtaining from them liquid hydrocarbons and ultimately motor fuels and oils. This method is being used at present in some places, although on a small scale. It has drawbacks, including the fact that it is expensive. A completely new method--the plasmochemical conversion of methane into acetylene and hydrogen--deserves serious attention. This method was developed by scientists and specialists at the Power Institute imeni G.M. Krzhizhanovskiy and at the USSR Academy of Sciences Institute of Petrochemical Synthesis imeni A.V. Topchiyev; this method has the advantage that after the subsequent conversion of the acetylene liquid hydrocarbons of almost any properties can be obtained in the chemical equipment, and this includes the hydrocarbons which make up motor fuels and lubricating oils. And it is this kind of process which will be used in the future to obtain motor fuel. But in comparison with the processes for refining petroleum, the gas refining procedures have not been adequately studied or developed. The scientists still have a substantial amount of work to do on them. This is completely natural because research work in this area was previously not carried out on a large scale as there was no practical need for it. But the situation is now changing, and preparations should be made in advance for the

fundamental change which will probably take place in the fuel and raw material balance of the economy.

With this article I would like to draw the attention of our republic's scientists and specialists to an important problem dictated by time itself.

8543
CSO: 1822

NEFTYANYYE KAMNI-ZHILOY GAS PIPELINE

Baku VYSHKA in Russian 19 Aug 79 p 1

Article: "Neftyanyye Kamni-Zhiloy Gas Pipeline"

Excerpts Construction has been completed on a 113-km gas pipeline laid on the sea floor between Neftyanyye Kamni and the island of Zhiloy. It is not very long--just 33 kilometers, but in terms of difficulty it surpasses anything the engineers of the Caspian have ever had to deal with. Very strong underwater currents have been observed in this area since ancient times.

On one segment of the line it resembles a kind of river; within its three-kilometer channel the water, even during calm weather, forms whirlpools which can move stones. When the pipe-layers reached this segment the underwater current shifted the pipes and broke the pontoons. But the divers, fitters, and installers matched their skills, steadiness and bravery against these elemental forces of nature.

The work was also complicated by the great distance from the platform where the pipes were welded into kilometer-long lengths. Then the pipes were covered with three layers of insulation and clad in a concrete jacket by means of special equipment.

On Zhiloy, the new pipeline was hooked up with pipes extended here earlier from the Apsheron Gas Main. This way, the casing-head gas extracted in NGDU [Petroleum and Gas Production Administration] imeni XXII S"yezd KPSS now has a direct pipe to the mainland.

Once the pipeline goes into operation, the production of gas at Neftyanyyee Kamni will increase by 35 percent.

Construction will begin next year on a petroleum pipeline between Neftyanyye Kamni and the mainland; this will make it possible to release tankers now hauling fuel to the mainland.

6854
CSO: 1822

## SURGUTNEFT/ NGDU SEPARATION UNIT

Moscow SEMELYA in Russian No 35, 27 Aug-2 Sep 79 p 2

[Article by L. Aleynik, correspondent of the USSR Ministry of Installation and Special Construction Work press center (Surgut-Moscow): "Surgut--One Big Construction Project"]

[Text] The diameter of this pipe can be compared to the dimensions of a circus building. There is an elevator inside. The iron cage clanks into action, and we ascend the pipe of the Surgut GRES, the largest in Western Siberia running on casing-head gas.

Formerly the gas was not utilized but was burned off in flares. Now it will be used as fuel to run the power blocks: In July, one month ahead of schedule, Unit No 10 went into operation, and the GRES's capacity now exceeds two million kilowatts.

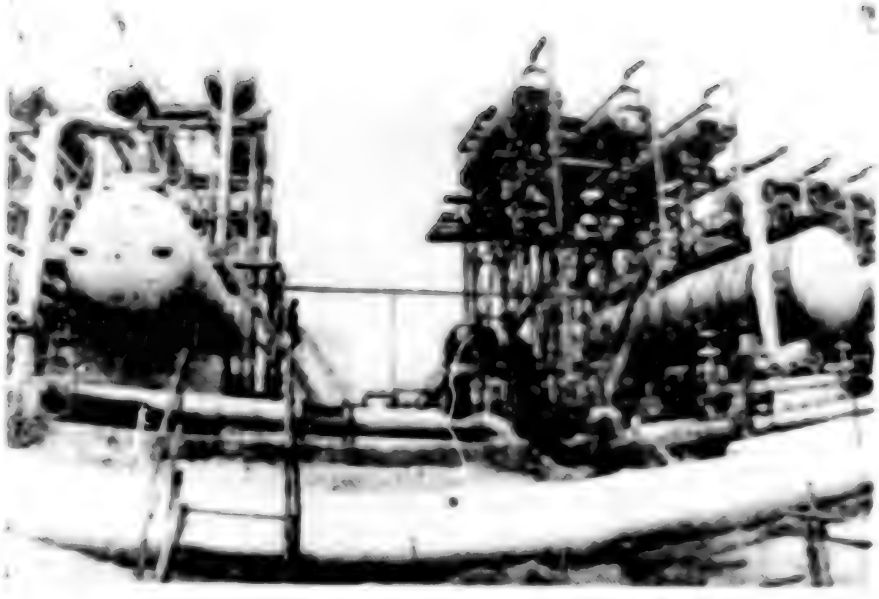
Now the pipe is 181 meters high, and in September it will reach its full height, increasing its present height by one-third. When it is operational, the smoke will be emitted above the clouds, and the air in the oil workers' city will be completely clean.

We come out of the elevator, and it's as if we were standing on the dome of the "big top." From this height we can see the astonishing flood of the Ob', the expanses of the Taiga, and the enormous port--during the short northern summer it operates day and night. This is where caravans set forth into the east oil-producing lands, and it is necessary to stock up as much as possible before all roads become impassable in the autumn.

All of Surgut can be seen from here, and it is all one big construction site. I ask crew-leader Viktor Fomin: What happens after you finish the pipe?

"We will start another one. And then a third. Did you know that a second Surgut GRES is to be built? It will have a truly astonishing pipe: 320 meters high."

The higher the better. It is well known that it is easier for nature to breathe when the smoke is above the clouds. And from a pipe like that you will be able to see a long way...



Surgutneft' NGDU Separation Unit

# CONFERENCE REVIEWS PRODUCTION PROGRESS AT GROZNY CHEMICAL PLANT

Moscow NEFTEPERERABOTKA I NEFTEKHIMIYA in Russian No 9, Sep 79 p 56

[Article by T. G. Khaimova]

[Text] On 22-24 May 1979 in the city of Groznyy a joint session of the section on organic synthesis of the Scientific-Technical Society of the USSR Ministry of the Petroleum Refining and Petrochemical Industry and the Technical-Economic Council of the Groznyy Chemical Plant imeni 50 Letiya SSSR devoted to the topic of experience with the operation of facilities to produce phenol and acetone, ethyl alcohol, and polyethylene and ways to further improve their efficiency was held.

The joint session of the sections was held in connection with a portentous date being celebrated by the collective of the Groznyy plant, the 20th anniversary of the launching of the first production unit.

Representatives of 31 organizations from the USSR ministries of the Petroleum Refining and Petrochemical Industry, the Chemical Industry, and Chemical and Petroleum Machine Building, as well as other ministries and departments, a total of 126 people, took part in the session. Twenty-five reports and communications were read.

The program of the expanded session of the sections included the work of three working groups:

1. production of phenol and acetone;
2. production of ethanol;
3. production of polyethylene.

R. A. Zagretdinov, chief of the section of organic synthesis of the All-Union Production Association Soyuznefteorgsintez [USSR Petroleum Organic Synthesis] of the USSR Ministry of the Petroleum Refining and Petrochemical Industry, presented a report entitled "The Current State

and Prospects for Development of Domestic Petrochemical Industry" at the opening, plenary session.

P. I. Vetrov, main engineer at the Groznyy plant, and candidate of technical sciences A. Yu. Bruk, chief of the special plant laboratory, gave reports at the plenary session concerning development of the Groznyy Chemical Plant, the struggle for technical progress, and insuring the production of high-quality output at the plant with minimum cost factors.

The communication by academician of the Academy of Sciences Azerbaijan SSR M. A. Dalin, director of the All-Union Scientific Research Institute of Olesein, was devoted to setting up the production of ethyl alcohol at the plant.

During the work of the group there was a broad exchange of opinions on the results of the work of the low-pressure phenol and acetone, ethyl alcohol, and polyethylene production facilities at the Groznyy and other plants and ways were outlined to modernize plant processes for the purpose of further increasing their efficiency.

At the final plenary session participants took note of the usefulness of meetings of this sort involving participation by representatives of the many scientific research institutes at plants employing similar production facilities.

The section adopted a resolution which set forth a number of steps whose implementation will permit a significant improvement in the production of the most important petrochemical products. The resolution also defines further prospects for the development of existing production facilities at the Groznyy Chemical Plant imeni 50-Letiya SSSR.



11,176
CSO: 1822

## SKILLED WORKERS FOR THE NORTH DISCUSSED

Moscow PRAVDA in Russian 16 Sep 79 p 1

[Article by G. Bogomyakov, first secretary of the Tymenskaya Obkom of the CPSU: "Cadres for the North"]

[Text] More than 20 years ago the young chief of a petroleum surveying expedition, the graduate of an Azerbaijan industrial institute, Farman Salmanov arrived in the Surgut Priob'ye. He ardently believed in the great Tyumen' petroleum and energetically joined in the search for it. From young specialist to the chief of the country's largest geological surveying organization--this is the path of this man. Today Farman Kurbanovich is in charge of the many thousands of people in the collective of the Main Administration for Geology of Tyumenskaya Oblast. His homeland has placed a high value upon his work. He has been awarded the title of Hero of Socialist Labor and has become a winner of the Lenin Prize.

When the industrial development of our first deposits of petroleum and gas began the oblast did not have its own petroleum and gas workers. The party sent major specialists and experienced production organizers here. They were followed by quite a few highly qualified drilling workers, field operations workers, construction workers, and transportation workers. The enormous scope of the work and a feeling of involvement in an important matter made it possible for many people to reveal their best qualities here.

From the very beginning the attention of party committees was directed toward this. Giving thorough support to the specialists who had arrived, they tried to create the best conditions for their creative growth. Speaking with Lenin's words, they tried "as carefully and patiently as possible to test and come to know genuine organizers and people with sober minds and practical skills...."

Today, under the difficult conditions of the north of Siberia, large highly qualified collectives which are capable of accomplishing the increasingly difficult tasks of the second stage of the development of the country's chief petroleum and gas base have already become firmly established. Indigenous labor traditions have been formed here. Miners and construction

workers from other areas in the country come for experience to Nizhnevartovsk, Surgut, Nefteyugansk, and Nadym.

Tyumen' is now not only a consumer of the cadres of other cities-- it itself trains them in many necessary occupations. Industrial, construction, and medical institutes and a university have been opened in the oblast. In ten years the industrial institute alone has graduated 12,000 engineers in specialties which are basically connected with the formation of the petroleum and gas complex. Many of its graduates have already become leading enterprise specialists.

We are trying to see to it that the cadres which are trained for work in the north in our vuzes and tekhnikums consist primarily of people from the north. Young men and women from the northern cities and settlements and youths from the indigenous nationalities have wide opportunities and, frankly, a preferential right to enter the oblast's educational institutions.

Our system of vocational and technical education has been raised to a completely new level. Since the beginning of the present five-year plan more than 50,000 graduates of vocational and technical schools have come into the economy of the oblast. Moreover, most of them have received specialties of which the indigenous inhabitants of this vast region previously did not even have any knowledge.

Of course, we understand that the task is not only to prepare a person for work in the north. Things have to be done in such a way that he becomes acclimated there and that the necessary working and living conditions are created for him. Solely since the time which has passed since the previous census (1970) the population of the oblast has increased by almost a half million people. The basic growth has occurred in the areas of the north-- in the Khanty-Mansiyskiy and Yamalo-Nenetskiy autonomous districts.

What has promoted this fact? During the period of the establishment of petroleum and gas Tyumen' the social housing fund of the oblast has increased almost threefold. Around 12 million square meters of residential houses have been built, schools for more than 200,000 pupils, children's pre-school institutions for more than 70,000 children, hospitals with 8,300 beds, and stores, clubs, and municipal and domestic enterprises.

True, it has to be acknowledged that the social "rear" is not yet keeping up with the development rates of production everywhere. There is a certain lagging in the construction of housing, children's institutions, and cultural and domestic facilities. But the state is trying to build up the life of our northerners in an overall manner. And the best results in creating conditions for attracting people and making them permanent have been achieved in those places where the party organizations show constant concern about cadres.

The petroleum workers of the "Shaimneft'" administration have recommended themselves as a harmonious and unified collective. It has the lowest labor turnover. Violations of labor and production discipline have been reduced to a minimum and there are no subdivisions which do not fulfill their state plans. And the chief "secret" in all of this is precisely the fact that the party organization skillfully conducts work on the selection and education of cadres.

It is very important that people who are capable and who have initiative have every opportunity for rapid growth. I know of quite a few interesting destinies in this administration. V. Kochnev, for example, began his work as a petroleum field operator. He completed the Tyumen' Industrial Institute as a correspondence student. He became an engineer. Now he is the chief of the Rayon Engineering and Technological Service. His work-mate B. Kutychkin also covered a path from operator to senior engineer. And not so long ago he became the chief of the industrial transportation section of the Uraysk gorkom of the CPSU. There are similar examples in other collectives also.

Work with cadres occupies a central place in the activities of the entire oblast party organization. In selecting, placing, and educating them our party committees invariably follow Lenin's principles, the chief one of which is to select and place workers on the basis of their political, practical, and moral qualities. We are persistently realizing the instruction of the 25th CPSU Congress to the effect that the modern leader has to organically unite within himself partiynost' and a profound confidence and discipline along with initiative and a creative approach to work. At the same time, he is obliged to be sensitive to people and to their needs and to serve as an example in work and in everyday life.

The qualitative composition of our cadres is constantly improving. Around 90 percent of the workers in the table of organization of our obkom have a higher and incompleted higher education and of them more than half are specialists in industrial and agricultural production. Almost every fifth has a party-political education.

The leaders of our enterprises and institutions rarely come "from outside" now--they develop, as a rule, in the labor collectives themselves. It is here that yesterday's vuz and tekhnikum graduates refine the knowledge they obtained in educational institutions and acquire the skills of working with people and other necessary qualities under the leadership of party organizations.

The party teaches that in promoting cadres it is important to take maximum account of the opinions of primary party organizations and labor collectives. For the most important thing is to notice and correctly evaluate a person's abilities in time and to give him the work where he will be able to most fully show what he can do. A cadre reserve for promotion has now been created in all of our party committees. The workers who are listed in it

are brought in to preparing questions for plenums and bureaus and for party meetings, intc analyzing the economic work of collectives and into carrying out other commissions with the help of which a person's creative potentialities and abilities as an organizer and educator of people are verified. This practice justifies itself.

We see that we still have many shortcomings in our work with cadres. Some people believe that our northern conditions can sometimes be used to write off lack of management and poor living conditions and the right to scorn the interests of people in attempting to achieve a large production goal. This is the way Klapanov, the manager of the "Yuganskneftestroy" trust, acted; his arrogance and snobbishness caused justified indignation in the collective. The Nefteyuganskgorkom of the CPSU gave him a strict punishment and he has been relieved of his duties as manager.

The leadership and party committee of Glavtyumen'neftegaz had to be seriously corrected for errors in work with cadres. In the "Megionneft'" administration, for example, things had gone so far that people had begun to be selected for leading posts on the basis of family ties. Party agencies had to intervene in this "system" of placing cadres and put things in order here.

There are cases of miscalculations in determining the practical qualities of leaders. This is what happened to us with the former first secretaries of the Surgut gorkom M. Konev and of the Yamalo-Nenetskiy district committee of the CPSU V. Tyurin. We are drawing conclusions from such errors.

It has been noted in the party obkom that sometimes the shortcomings of certain leaders are tolerated for too long. It is for this reason, for example, that the work of the Glavtyumen'promstroy and a number of its subdivisions which have major failures at construction projects has not been set right.

I will also say this. Certain administrations and ministries send us people for leading posts who have compromised themselves in other places. You can also meet people who act like "temporaries." They have done us a favor by coming, and are already thinking about leaving. Usually nothing good comes of such workers. Siberia needs devoted and bold people with initiative who possess a wide horizon and an uncommon scope. The party organizations are striving to cultivate a militant spirit in cadres for the taking of new heights and a pride in their work, and are struggling uncompromisingly both against whining about difficulties and against bragging and overconfidence.

In speaking about our future prospects one has to touch upon the following problem. Vocational and technical education is in need of even more rapid development. Glavtyumen'promstroy, for example, is lacking several thouand workers; however, this main administration practically does not train

its own brick-layers, concrete workers, and plasterers. The same can be said about the organizations of the Ministry of Petroleum Industry. The need for workers in many occupations will increase by two and three times here in the next few years, but the training base for them is lagging behind. Nor can it be regarded as normal that there is only one petroleum tekhnikum in the oblast. Simply because there is nowhere to obtain a profession today every year more than 500 secondary school graduates leave Nizhnevartovsk the chief petroleum extracting area of western Siberia.

There are now around 30 scientific research and planning institutes in the oblast. Quite good cadres, among which there are many young people, have taken shape here. They are making an important contribution to the development of the fuel and energy complex. There needs to be a further creative growth of scientists and planners which could be promoted by the creation of subdivisions engaged in basic scientific research. The USSR Academy of Sciences is for now represented in our oblast by a small group of people whose possibilities are very limited.

Large new tasks are now facing Tyumenskaya oblast. The petroleum extraction which has been attained will have to be increased by 1.5 to 2 times and the gas extraction level will have to be raised by several times. At the second stage of the formation of the complex it will be necessary to create a powerful petroleum and gas refining industry and to develop electric power engineering at high rates. The amount of construction, transportation, and other work will increase. It will be necessary to give increasing attention to agricultural production in order to more fully supply the rapidly growing needs of the population of our northern cities for food.

The oblast's party committees are being guided by Comrade L. I. Brezhnev's statements to the effect that the riches of western Siberia have to be taken not by numbers, but by skill. This obliges us to constantly show concern for increasing the expertise and responsibility of our cadres--those which already exist and those new ones which with our rapid economic development rates are continuing to reinforce the labor collectives of the Tyumen' north.

2959
CSO: 1822

## BRIEFS

LENINGRAD FUEL EQUIPMENT--Leningrad, 28 September. Tasks of further increasing the contribution of Leningrad's workers toward improving the effectiveness of the country's fuel and energy complex were discussed today at a meeting of the Leningrad Obkom Council of Economic and Social Development. It was noted that at present the Leningrad workers are developing and manufacturing a considerable portion of all of the country's basic energy equipment. In accordance with the tasks set forth at the 25th party congress, CPSU CC plenums, and in statements by Comrade L. I. Brezhnev, plans call for drawing up a specific program for further increasing the Leningrad workers' contribution toward improving the effectiveness of developing the country's fuel and energy complex and the all-out campaign to conserve fuel and electricity. CPSU CC Politburo member and Leningrad Obkom First Secretary G. V. Romanov spoke at the meeting. [Text] [Moscow IZVESTIYA in Russian 30 Sep 79 p 2] 6854

NEW GASLINE PIPES--Novomoskovsk, Dnepropetrovskaya Oblast. The Novomoskovsk Pipe Plant is well known to the Western Siberian builders of long-distance oil and gas pipelines. The products of this enterprise, bearing the Emblem of Quality, are in big demand in Nizhnevartovsk, Nefteyugansk, and Samotlor. "In the works," says plant director A. Shvedchenko, "is the manufacture of large-diameter double layer welded pipes for long-distance gas pipelines. They are capable of withstanding pressures of up to 100 atmospheres." The technology of making the double-layer pipes was worked out by plant specialists in collaboration with scientists, designers, and project-planners of the All-Union Order of Lenin Scientific-Research and Project-Design Institute of Metallurgy Machine Building, the Ukrainian SSR Academy of Sciences Institute of Electric Welding imeni Paton, the Elektrostal' Heavy Machine Building Plant, and the Ukrainian State All-Union Institute for the Project Planning of Metallurgy Plants. [Text] [Moscow IZVESTIYA in Russian 30 Sep 79 p 3] 6854

PAVLODAR OIL REFINERY PROGRESS--The Pavlodar Oil Refinery is a young enterprise. Less than a year has gone by since it started up. Socialist competition is widely underway in the collective under the slogan "Each Unit Up To Projected Capacity." As a result, the refinery installation was brought up to full load ahead of schedule. And thanks to improved technological

systems it has been possible to organize the production of a new item--isopentane, which is a valuable feedstock for synthetic rubber. [Text] [Moscow PRAVDA in Russian 17 Sep 79 p 1] 6854

VOROSHILOVGRAD GAS ASU--Voroshilovgrad. Electronics is now helping to ensure uninterrupted and high-quality operation of the city's gas works. Yesterday an automated gas supply control system went into operation in Voroshilovgrad. Electronics will make it possible for gas workers to shift energy resources efficiently and save fuel. At present, similar systems are being developed for Kiev, Khar'kov, Dnepropetrovsk and other cities in the Ukraine. They will be the basis for developing a unified sector system of gas supply control in the republic. [Text] [Moscow TRUD in Russian 5 Oct 79 p 1] 6854

BAKU RESIDUAL OIL DEVELOPMENT--Drilling wells for residual oil has made it possible to halt the natural decline in fuel extraction in many of Baku's old fields. The productive strata of the Apsheron field have become severely depleted after 100 years of exploitation, but geologists still find rock formations containing considerable amounts of oil. Just such a horde has been discovered by the drilling crew headed by foreman Rafi Mukhtar of the Apsheron Administration of Drilling Operations, which drilled well No 3482 in field No 7 of Leninneft' NGDU. The well is producing a powerful flow. The drilling of wells in older fields is complicated by the fact that the drained strata strongly absorb the drilling fluid. Rafi Mukhtar, I. Berezovskiy, Z. Ismailov, and other foremen are working expertly with the fluid and achieving high drilling rates. [Text] [Baku BAKINSKIY RABOCHIY in Russian 18 Sep 79 p 2] 6854

FLOATING WELDING RIGS--Surgut (Tyumenskaya Oblast), 26 September. A new floating welding complex will help builders to lay steel pipe across the difficult Siberian swamps at any time of the year. It was designed by Leningrad specialists. The first sample has been delivered to northern Tyumenskaya Oblast. The floating equipment will help the builders during times when all roads are impassable, especially when warm weather sets in, when the ice in the rivers, lakes, and swamps breaks up and become impassable. During such times, many oil and gas fields become practically inaccessible. This is why pipelines are usually laid during the wintertime when the ground is frozen. The new complex is designed for welding and installation work in swamps. All of the equipment used to join the pipes, insulate them, and lay them in the trench is installed on floating platforms. An excavator heads up the caravan and blazes the path for the entire complex. [Text] [Moscow PRAVDA in Russian 27 Sep 79 p 2] 6854

NEW GASLINE PIPES--Dnepropetrovsk. The high-quality steel pipes from Novomoskovsk are well known throughout the country. Striving to complete the state plan of the fourth year of the five-year plan, the collective of the pipe plant is diligently seeking reserves for raising the effectiveness of production and product quality. For example, in Pipe-Welding Shop No 2, after remodeling, practically all of the pipes (94 percent) now bear the state Emblem of Quality. Pipe-Welding Shop No 1 is preparing to produce

double-layer spiral-seam pipes for high-pressure gas pipelines. The technology line is being remodeled for the purpose. [Text] [Kiev PRAVDA UKRAINY in Russian 5 Sep 79 p 2] 6854

CHERNIGOV OIL--In the oil fields of the Chernigov area, the collective is experienced--one of the best in the republic. Several days ago it was awarded the challenge Red Banner of the Ukrneft' Association and the republic committee of the Trade Union of Workers in the Oil and Gas Industry. What are the components of the success of these leading workers? Hundreds of wells have been equipped recently with deep-well electric pumps, many have been converted to optimal operating conditions. Chemical treatment of the bottom zone is widely practiced. Automation has proved to be an excellent help to the oil workers. Every innovation represents additional tons of oil. For example, in 24 wells acid treatment has been introduced; as a result, 2,500 tons of oil above the plan have been produced. The Talalayevka field is now completing preparations to start up a low-temperature separation unit. This will result in improved oil quality and increase the percentage of utilization of casing-head gases. Above plan oil is being produced every day. This year more than 18,000 additional tons have been produced. And another 14 million cubic meters of natural and casing-head gas have been produced. [Text] [Kiev PRAVDA UKRAINY in Russian 22 Sep 79 p 1] 6854

NEW COAL PIT--Pavlodar. Thirteen kilometers from Ekibastuz work is underway on a new coal pit, the Vostochnyy. Access roads and a power line are being built. Drilling crews have begun stripping operations. The new pit will produce at least 30 million tons of coal per year. [Text] [Moscow IZVESTIYA in Russian 28 Sep 79] 6854

ROOFTOP BUILDING HEATERS--Scientists of the Kiev Ukrgiproinzhproyekt Scientific-Research Institute have proposed an original method for heating the older buildings of Leningrad with boiler units installed on the roof. This kind of installation will make it possible to preserve intact the architectural appearance of districts located far from the city's central heating mains. The units will consist of light-weight, small-sized heaters that can be put together in modular fashion to build heating units of differing sizes depending on the building's total area. Heat losses in the network will be substantially reduced, thus helping to conserve gas. The new heating systems will also be widely used in modern structures in rocky soil, in seismically dangerous zones, and also in areas where it is too difficult to install heating lines. [Text] [Moscow IZVESTIYA in Russian 23 Sep 79 p 2] 6854

NEW GAS DEPOSIT--Tyumenskaya Oblast. Drilling rigs have appeared in the lower reaches of the river Taz, where the Ust'-Chasel'skoye gas deposit has been discovered. To bring them here, the Siberians had to make a long and difficult journey by way of the Arctic Ocean. As their main base the exploration workers selected the village Krasnosel'kup. The expedition took that name. The geologists set a fast pace from the very beginning. Crews

headed by foremen F. Khusnutdinov and K. Bikbulatov are among the leaders in socialist competition among the collectives. [Text] [Moscow IZVESTIYA in Russian 23 Sep 79 p 1] 6854

NEW WELL DRILLING TECHNIQUE--A well being drilled in souther Uzbekistan by the exploration workers has been converted into a gigantic electrode. The drilling mud pumped into the well's interior has been an electrical charge. As a result of electrical interaction with the rock, a solid shell is formed on the walls of the well and prevents cave-ins. The operating conditions of this liquid "electrode" are regulated by a compact device designed by the scientists of Tashkent's Central Asian Scientific-Research Institute for Gas. The new drilling technology reduces the consumption of chemical reagents and shortens the drilling time. The cost of the equipment is recovered after 500 meters of drilling. The first batch of electrical devices has been sent from Tashkent to the oil workers of Tyumen' Baku and other regions in the country. [Text] Moscow SOVETSKIY VOIN in Russian No 14, Jul 79 p 47] COPYRIGHT: "Sovetskiy Voin", 1979. 6854

OFFSHORE DRILLING EQUIPMENT—Sverdlovsk—Designers at the Uralmash Plant have begun work on the plan for the fifth complex of equipment for the 600/60 offshore drilling rig. This machine will sink wells to 6,000 meters in water 200 meters deep and can hoist the equipment itself. [Text] [Moscow IZVESTIYA in Russian 22 Sep 79 p 1] 11176

CONDENSATE RECOVERY UNIT—How can condensate, a valuable raw material for the production of engine fuel, be recovered completely from a gas deposit? This question still remains unanswered. The problem is that the liquid accompanying the gas, which is twice as valuable as oil, does not allow traditional methods of extraction such as flushing with water. Specialists at Ukrgazprom [possibly Ukrainian SSR Main Administration of the Gas Industry] have suggested pumping condensate out using the gas that is being extracted. To do this construction has begun, at the Novotroitskoye deposit in Sumskaya Oblast, on the country's first installation using the so-called "recirculation" process. It is based on the ability of gas to carry a small amount of condensate up from the interior. Only 30 percent of total reserves were obtained in this way before. But now the decontaminated dry gas is pumped into the well again and again by powerful compressors. Each time it returns to the surface the condensate is taken off into special tanks. This continues until the pool is completely exhausted. [Text] [Kiev RABOCHAYA GAZETA in Russian 16 Sep 79 p 4] 11176

CSO: 1822

END

# END OF FICHE

# DATE FILMED

15 NOV 79

WB